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The Philosophy
of
An Organ Builder

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"Temple of Tone art thou! The shrine supreme
Of Sound's mysterious powers and richest gifts,
God-given thought alone could have inspired
The human mind to frame so grand a work!
Great Organ— Monarch of all Instruments!"

—George Ashdown Audsley

THE PHILOSOPHY

OF

AN ORGAN BUILDER

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ESTEY ORGAN COMPANY
(Founded 1846)
BRATTLEBORO, VERMONT
U. S. A.

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BRATTLEBORO, VERMONT

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Purpose and Intent

A PIPE organ is built according to individual specifications and measurements. An organ catalog in the usual sense of the word is not possible. Instead, you will find here what we believe you would like to know about our methods of construction and, of equal importance, about the Estey Organ Company itself.

The intent of this book is to provide information on pipe organs for those who wish to bring their best judgment to bear on the purchase of an instrument. This book will not make you an expert critic of organ construction but it will enable you to distinguish what is vital and fundamental and give a basis for an intelligent decision.

We have tried to write this book so a lover of music, without any knowledge of the instrument, may quickly grasp the general principles of the art of organ building and the specific and distinctive contribution which the Estey Organ Company is making to that art. Those who already know organs will find new material of interest in all but two or three sections.

This is not a catalog which can be digested in thirty minutes, but a book on the Pipe Organ which we hope will be worthy of several hours of your attention and study.

Philosophy and Organ Building

A BUSINESS which has operated for over seventy-five years in the same town and has been continually under the active management of sons and grandsons of the founder develops a definite philosophy.

We have called this book *The Philosophy of an Organ Builder* so that we may be free to set forth our concept of the organ business, evolved after many years of building, and to attempt to express something of the spirit and purposes of this company.

Philosophy may be an ambitious word to apply to a commercial enterprise, but we feel that our history and accomplishment entitle us to be rated as an institution, and an institution is but the physical manifestation of a set of beliefs and purposes.

Organ builders have come and gone because the business requires balance between the commercial and the artistic. Too much enthusiasm in cutting manufacturing costs is as fatal as slighting the voicing of pipes or proper balance of tone. We recognize a responsibility for the careful conduct of this business to two classes, several thousand owners of Estey Pipe Organs and several hundred employees with their families.

Our belief is that every successful business must be idealized to a certain extent in the mind of someone. The building of organs lends itself very readily to idealization. We find no difficulty in keeping up to a high standard a product of such a noble use, calling as it does for the best from many kinds of minds and hands. On a commercial basis of production we could build more organs and sell them at a lower price. However, we believe we can continue to prosper on our present

policy of producing only organs with artistically voiced pipes, with mechanical parts honestly designed and made with service, durability and simplicity as the tests of acceptance.

When you purchase an organ it must be on the basis of confidence in the builder, because your organ is made after the order is placed. We hope our philosophy of doing business will appeal to you. We are so sincere in this matter that we never can be fully satisfied with what is printed in a book of this kind. You must read between the lines.

Human Faculties and Organ Music

THE modern, fully equipped pipe organ is the largest, most powerful, most beautiful and varied toned musical instrument in the world.

Just as violins and pianos vary in mechanical and tonal quality and grades, so are there grades in pipe organs. Regardless of the size of the instrument the Estey Organ Company makes but one quality of mechanical and electrical action and supplies only the best material it knows for the specific purpose. Pipes of a certain type are all made by the same process and voiced by the same men, regardless of the size of the organ. Difference in the tonal effect of different installations is due primarily to the coloring which large organs have because of increased number of sets of pipes or stops. Even a small organ stirs the emotions as no other instrument can.

This is not surprising when you consider the many faculties of man which contribute to the harmony, the depth, the sweetness, the flexibility and volume of organ music. The next time you hear an organ, consider for a moment the combined human faculties which make it possible. It has taken the imagination and originality of the composer to create the music, the skill and patience of the pipe voicer to produce the rich organ tones and marvellous orchestral effects, the ingenuity and knowledge of the designer to provide the necessary mechanical features and the dexterity and feeling of a musician to co-ordinate the other three factors.

The best organ builders uphold their responsibilities in this chain by making and voicing their own pipes and making as many of the mechanical parts as possible. The Estey Organ

Company for years has bought only raw material for its organs. Even the pipe metal is cast and rolled in the factory. It makes the keys, the electric magnets, all electric and mechanical parts according to designs prepared to meet conditions to which those parts are subjected. The ingenuity of our designing amounts to genius. Visitors to the factory all express amazement at the simplicity and "common sense" of our methods and delight in the workmanlike quality, durability and finish, not only of the moving parts, but even the relatively unimportant items which go out of sight in the organ.

The skill and patience of a pipe voicer entitle him to be classed with the few remaining artisans in this age of machinery. This work is possible only after an apprenticeship of many years. The pride of the true artisan upholds the quality of Estey pipes. Our voicers accept the credit and the attendant responsibility for the Estey reputation for tone. Perhaps it is this which keeps our pipe tones superior to those of pipe makers who voice and sell to many organ builders.

Fundamentals of Organ Construction

THE musical tones of the organ are produced by pipes of metal or wood which are made to speak by compressed air. The passage of air to the pipes is controlled by keys on a keyboard, similar in some respects to a piano keyboard.

Tonally, a pipe organ could be described as a group of orchestral and other instruments which are individually and collectively under the control of a single musician. Physically, the pipe organ could not be so described for the reason that in most cases the pipe reproducing the tone of a certain instrument has no similarity in appearance to that instrument.

While the organ builder is able to reproduce the tone of orchestral and other instruments by means of pipes, he is not able to produce the complete range of the instrument on one pipe. As an example, let us consider the clarinet of the orchestra and the clarinet tone of the organ. The orchestral clarinet is a unit in itself and, by proper manipulation, this unit can be made to produce an entire range of notes. While the organ builder knows how to treat a metal pipe to secure from it the quality of tone produced by the clarinet, he can get but one note from that pipe. In other words, he must make a separate pipe for every note in the range of the instrument, taking care to see that the quality of tone is uniform throughout.

This explanation holds good for every tonal unit in the organ. Each must have its complete set of pipes. Such set of pipes is called a Stop.

The number of tonal units or stops which an organ may contain is unlimited. The number usually is determined by the

size of the building the organ is to serve, the space available for its installation and the size of appropriation to be expended.

For the sake of simplicity in the balance of this section the technical descriptions have been reduced so as to include only the essentials. Some of the statements are general; amplification and qualification have been omitted.

Pipes

Pipes are of two kinds, wood or metal, each of which may be subdivided into flue pipes and reed pipes. The former may be further divided into open and stopped pipes.

In flue pipes the vibration of the air is caused by the wind entering the pipe and striking against an obstruction at the mouth. This obstruction may be of several different shapes, depending upon the quality of tone to be produced.

The open flue pipe produces a tone which has a pitch determined by the length of the pipe measured from mouth to top. In other words, it has a pitch of the length of the column of air vibrating within the pipe. If we put a cover or stopper in the top of an open flue pipe, we have a stopped pipe which produces a tone the pitch of which is twice the length of the pipe from mouth to top. Thus, a 4-foot stopped pipe will be of the same pitch as an 8-foot open pipe. Stoppering a pipe makes a distinct change in the character of its tone.

In a reed pipe, the column of air within the pipe is set in vibration by the tongue of a reed which is made to vibrate as the air passes through it into the body of the pipe.

Pipes differ from one another tonally in three ways: pitch, quality and volume of tone. The pitch depends upon the length of the pipe from mouth to top. The quality of tone depends upon the amount of air entering the body of the pipe and

the manner in which it is caused to vibrate. The volume depends upon the pressure of the air entering the pipe and the scale or area of the pipe in cross section.

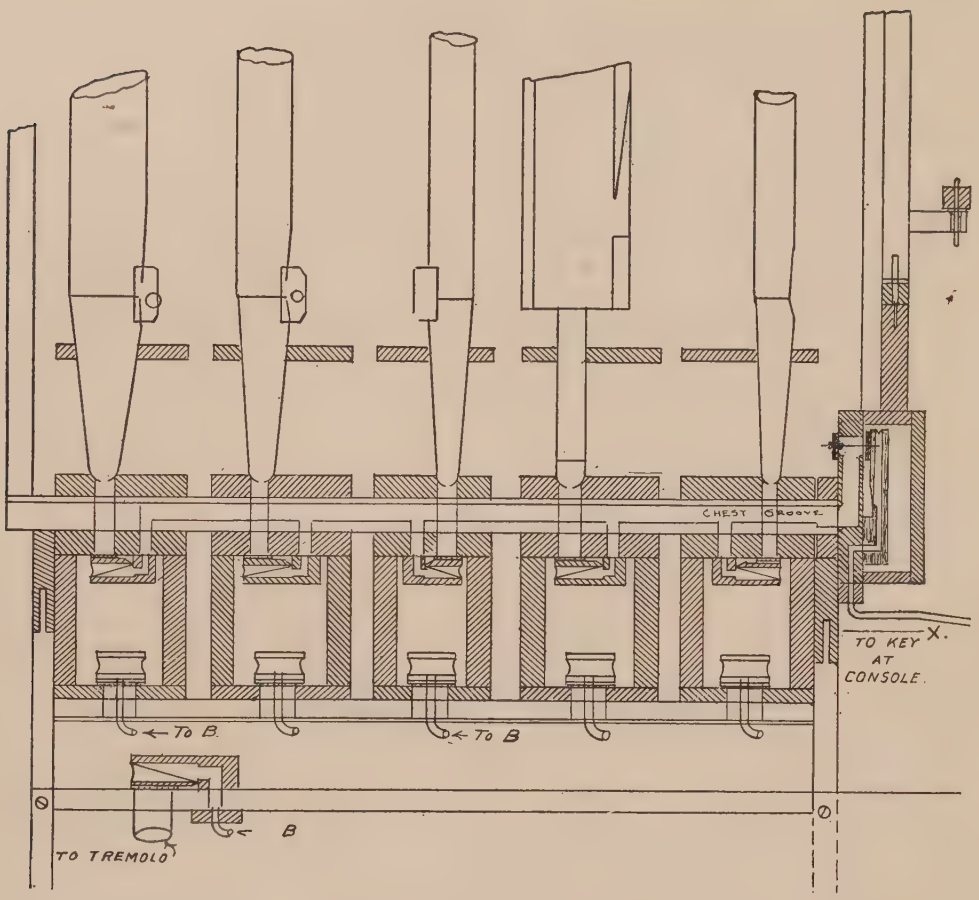
Air Supply, Wind Chests and Action

The source of the supply of air used in an organ is usually a fan blower operated by an electric motor. From the blower the air is delivered to the organ, where it is acted upon by a reservoir or regulator which brings the air to the proper pressure and delivers it to the wind chest.

The wind chest is primarily a wooden box. It must be sufficiently wide to accommodate sixty-one or seventy-three pipes, and sufficiently deep to accommodate the number of stops or sets of pipes to be placed on the chest. About seven inches in depth is the average allowed for each stop. This, of course, varies with the size of the pipes. The interior of the wind chest is partitioned off so that each set of pipes has in reality its own wind chest and valves. Through the top of the wind chest holes are made to allow the air under pressure to pass from the chest into the pipes. The sizes of these holes depend upon the size of the pipe placed over them.

If live air is allowed to enter the wind chest and the valve between the chest and any pipe on it is opened, that pipe will speak. In order to bring the air which is under pressure in the reservoir to the wind chest, a tablet or knob is placed near the keyboard, convenient to the musician. Each set of pipes or partition in the chest has its own tablet or knob. When one of these tablets is operated, it actuates certain valves which in turn allow air to enter the desired partition in the chest.

In order to establish communication between one or more partitions in the chest, the pipes placed on those partitions and the keyboard, it is necessary to have an action. An organ action



Cross-Section of Chest

This drawing illustrates the construction of a chest showing the chest pneumatics and valves under each pipe and an intermediate valve (just above x at the extreme right) controlling all the notes of the same key for this division of the organ.

When a key at the console is depressed, compressed air enters the tube x, and expands the intermediate pneumatic. This opens the exhaust valve which allows the air under pressure in the "chest groove" to escape. This in turn causes the chest pneumatics to collapse and the pipes to speak in those chests which have had wind admitted to them by operation of the stop tablet.

An electric action is identical except a magnet is added to actuate the intermediate pneumatic as a means of operating the exhaust valve.

may be one of two types. It may be either tubular-pneumatic or electro-pneumatic. In the case of tubular-pneumatic action tubes are run from the keys to the chest. When a key is depressed (providing a stop tablet has been operated to place wind in any partition in the chest) air rushes through the tube and actuates a pneumatic which in turn releases a valve in the hole between the chest and pipe and allows the air to enter the pipe corresponding to the key depressed and causes that pipe to sound.

Electro-pneumatic action functions in practically the same manner except that, by depressing the key, the organist makes an electric contact which allows current to flow along one wire in a cable in place of the air in the tube, as above. This current operates a small magnet which releases a valve, the magnet replacing the pneumatic referred to above.

It has been found that compressed air will not flow through the tubes satisfactorily for a distance of over twenty feet, so electro-pneumatic action is substituted for pneumatic when the keyboard is more than twenty feet from the chest.

Console or Keydesk

That part of the organ which contains the keyboard is called the console or keydesk. Besides the actual keys, this unit contains the stop tablets or knobs, expression pedals, pedal keys, combination pistons and all accessories with which the instrument may be equipped.

Originally all organs were equipped with only one keyboard, but gradually more were added until now we have consoles which contain five separate keyboards in addition to the pedal keys. In modern organs, each keyboard contains sixty-one keys. The reason for additional keyboards is their value

in securing musical effects and in making the larger instruments more flexible.

With one keyboard, it was generally understood that the organ contained one wind chest with its various sets of pipes. We can consider that each keyboard affects its own particular wind chest with its stops or sets of pipes. The various keyboards have been named and the chests controlled by each are considered as separate divisions of the organ, each bearing the name of the keyboard which controls it.

The usual designation for divisions of the organ are as follows. An organ with two manual keyboards is called a two-manual organ and contains a Great, Swell and Pedal division. A three-manual organ contains, in addition to the Great and Swell division, a keyboard and division termed Choir. A four-manual organ, in addition to the Great, Swell and Choir, may have a Solo or Echo division and keyboard. A five-manual organ usually has a Solo and Echo, or a division called by another name, as separate divisions and manuals.

Tonal Division of the Organ

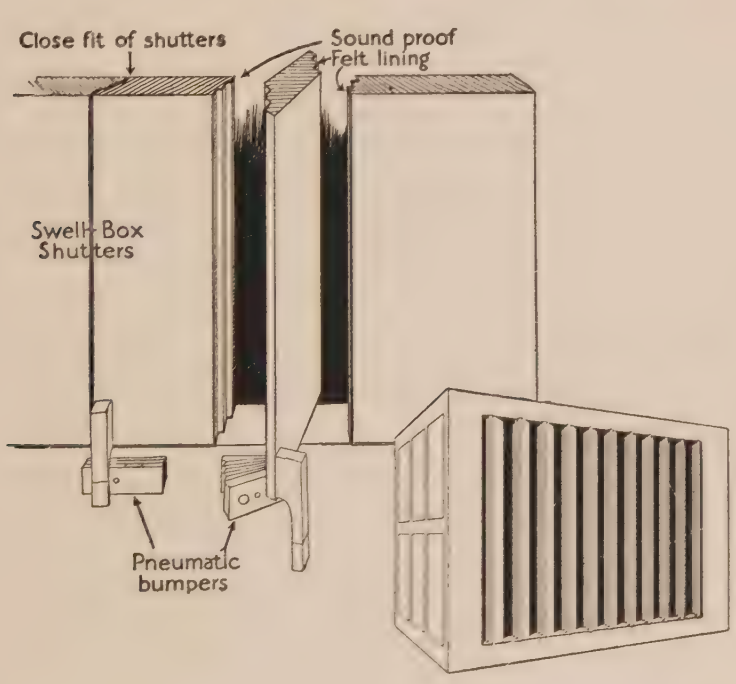
Each division in an organ differs tonally from every other division. With this arrangement the beautiful and varied tonal effects are made possible.

In a two-manual organ the Great division contains the pipes with fundamental or foundation tone and such tones as might be termed solo in character. The Swell division is composed mostly of accompanying tones with possibly a few stops of solo character. In a three-manual organ, the Choir division might be termed a continuation of the Swell division, being composed mostly of accompanying stops. In a four-manual organ, the Solo division, as the name implies, consists mainly of stops of solo character with assertive tones. The Pedal divi-

sion is the bass of the entire organ and contains the pipes of lowest pitch. In many cases, stops available on the manuals are also made playable on the pedals in order to secure certain effects. The stops in the Pedal division are played with the feet from pedal keys attached to the lower part of the console. There are usually thirty-two keys for the Pedal division.

Swell Boxes

In order to make the pipe organ expressive and flexible, certain special controls have been placed in the instrument. It is possible for the organist to control to a marked degree the volume of tone in an organ and particular chest by depressing a pedal which is connected with shutters in a sound-proof box surrounding that particular division. When the pedal is depressed, the shutters are opened and full strength of tone secured. When the pedal is again brought back slowly to its



original position, the shutters are closed and the volume of tone gradually decreased. The Swell, Choir, Solo and Echo divisions are always provided with one of these boxes, which are called swell boxes, and sometimes the Great organ is also enclosed.

Combination Pistons

For the convenience of the organist, combination pistons are supplied as a supplementary control of stop tablets. Each piston brings on a group of stops. This saves the organist the time it would take to operate individually the number of tablets controlling the stops he wishes to use. The number of these combination pistons depends upon the size of the organ and the variety of tonal units. These combination pistons can be set to bring on any group of stops desired and are easily adjustable from the organist's bench.

Location of the Organ Chamber

The organ chamber may be located in nearly any position in the building providing there is sufficient space for the installation and providing it is possible to assure the passage of tone from the organ chamber to the room where the music is to be heard.

Care should always be taken in a church installation to have the organ chamber and the choir in close proximity. If the choir is at some distance from the organ and must necessarily wait even a fraction of a second for the tone from the organ to reach it, the desired effect may be ruined. Care should also be taken to have the organist with the choir. The organist is often the leader of the choir when the choir is singing and should be located with it.

In cases where the architect is seeking information regarding an organ installation in a church already completed, it is necessary that the organ builder have accurate dimensions of the plan, elevation and section of the building, giving position and projection of any breaks in the room where the organ is to be located, designating beams, ducts or plumbing.

Conduits for Cables

The following conduits should be run by the purchaser of the organ, to take the electric cables: one 1-inch conduit from the blower room to the organ chamber, one 2½-inch conduit from the console to the organ chamber. If there are two organ chambers, a 2½-inch conduit from one chamber to the other, as well, should be run.

These conduits are necessary only when the organ is equipped with electro-pneumatic action. A 1-inch conduit should be provided from the console location to the blower room if a starting switch is wanted on the console, this switch to start the motor and blower.

The organ builder should be advised of the location of the console in order that the cables may be cut to correct lengths and in order that preparations may be made if the console is to be recessed in a wall. The organ builder should also be advised whether or not the console is to be movable.

A 3-inch wind conduit should be run from some convenient point on the main wind trunk to the console location, if tubular-pneumatic action is used.

Treatment of Tone Openings

This is a subject which should receive the careful attention of the architect who is working on an organ installation. In many

instances the tone opening is filled with ornamental front pipes which are placed on top of the casework. This particular treatment is quite popular in church installations.

Present day tendency is to get away from the large ornamental case, substituting in its place an artistic grille. Placing a grille in the opening for the passage of tone is not only an artistic manner of treating the opening, but also is desirable from a practical standpoint as it gives a greater amount of free opening for the tone than an opening filled with front pipes. It is quite necessary for the organ builder to know whether the architect contemplates using an ornamental case or a grille, in order that he may design his interior construction accordingly.

Location and Construction of Blower Room and Wind Trunk

The blower room should be located preferably in the basement of the building and should be made as nearly sound-proof as possible. A supply of clean, dry air should be available at all times. Except for a very large installation, a blower room 8 feet square by 6 feet high should be large enough.

The wind trunk should be of galvanized iron pipe and should be round. The diameter or gauge of the wind trunk depends upon the size of the blower and size of the organ and must be determined for each installation. The range is from eight to twenty-four inches. The wind trunk should be run in as direct a line as possible to the organ chamber, eliminating turns and elbows.

Items Concerning General Construction

The following items should be understood by both the organ builder and architect:

(a) Dimensions of all breaks and projections into the organ loft.

(b) Do any beams project below ceiling?

(c) Do any plumbing pipes or steam or water pipes project into the organ loft? If so, their location.

(d) All outside walls adjacent to the organ chamber should be thoroughly damp-proof.

(e) One general light at the entrance of the organ chamber should be furnished, also a light with wire basket protection on extension cord for working on the organ.

(f) It is imperative that the organ be protected from all moisture.

(g) The organ builder should be advised concerning the kind of current which the power company delivers to the building where the organ is to be installed; direct or alternating, volts, phase and cycles.

Types of Organs

FOR a long time the pipe organ was limited to one general place and use—the church, as an accompaniment of worship. Gradually its field has broadened until now we really have four distinct types of organs, made necessary by the different service each type must perform.

The four types might be generally described as Church, Concert, Theatre and Residence. As the names imply, each type is for installation in a particular kind of building and is designed to produce effects in keeping with the purposes of that building. This is the tonal difference. Mechanically, Church, Concert and Residence Organs are the same except that the latter has additional mechanism which will play the organ automatically from a perforated paper roll. The Theatre Organ is usually a "unit organ," which calls for a radical change in the design of action.

There is no particular reason why a church should purchase an organ in design greatly beyond its requirements, which are practically limited to providing accompaniment to choir or congregational singing or a soft musical background for other parts of the church service. It was only natural that organ builders felt that their art was being limited by the restricted needs of the churches. They could not build the large solo or concert organs of which they dreamed because a church had no need for them. At the same time the organ had begun to come into its own as a wonderful instrument apart from church worship. The number of musicians giving the organ their entire attention greatly increased and these musicians were anxious to see the organ builders increase the size and scope of the instruments

they were building. The result of these forces working together was that the large concert halls which were being built were almost all equipped with concert pipe organs, representing the dreams of the organ builders and desires of the organists.

The success and popularity of these installations in concert halls were tremendous; now a hall of this type is considered incomplete unless it contains a modern Concert Pipe Organ. A great majority of the municipal buildings which are being constructed in large numbers today all contain pipe organs of the Concert type. In these enormous auditoriums celebrated organists give concerts and recitals, drawing crowds without distinction as to sect or denomination and supplying musical satisfaction unsurpassed by any other instrument.

The type of organ which has enjoyed the most rapid development is the Theatre Organ. Many people can remember when an organ in a motion picture theatre was a matter of astonishment. Today, there is hardly a well-appointed picture theatre which does not have a pipe organ especially designed for theatre use. The growth of the organ in this field may be attributed to several causes. First, it is so much more satisfactory to the patrons than a medium-sized orchestra of medium ability. Even in the big metropolitan theatres where the organ alternates with a symphony orchestra, few listeners are aware when the organist relieves the orchestra. Music, to satisfactorily interpret the action of a motion picture, must be subject to lightning-like changes. One man at the keydesk of an organ with the instrument under perfect control is able to "play the picture" fully as satisfactorily as a large orchestra. Another reason for the popularity of the organ in the theatre is the improvement in the organ itself. When it was seen that the theatre offered a field for organs, the organ builders of the country immediately set themselves to work to develop an organ

solely for theatre use. Their efforts resulted in an instrument capable of innumerable tonal combinations and of the greatest flexibility. This increased flexibility and tone coloring are what distinguish a theatre organ from church and concert organs.

Residence Organs

The general increase in popularity of the organ and organ music and the perfection of an organ adapted for use in a residence opened up a field for the fourth type, or Residence Pipe Organ. In the residence installation, more than in any other type, the organ closely approaches the orchestra, and will furnish orchestral music, either for concert purposes, for dancing or for any occasion where music is required or desired.

For years pipe organs have been placed in private homes. Development of an automatic playing mechanism, however, has opened the wonders of organ music to homes where organists are not available. The mechanism will play an individual selection as satisfactorily as an organist and without a listener being able to distinguish between the two. The element of "touch," so important on a piano, is not vital here, as a pipe speaks the same quality, pitch and volume whether the key is depressed by a hammer or a feather.

The Estey Organist or automatic player is a remarkable invention which will play the entire instrument by paper rolls, controlling not only the notes, but also the registration. Stops are brought on and cancelled, the swells operated and tempo regulated, all without the slightest aid from human hands.

The time is coming when a large house, old or new, will be incomplete without a pipe organ.

Specifications as the Measure of an Organ

ONE of the difficulties with which a pipe organ builder has to contend lies in the fact that purchasing committees are handicapped by the lack of an exact scale or series of tests which will demonstrate the relative merits of one make of organ as compared with others.

A committee of laymen can profit by suggestions from those organists who have made a business of studying organ construction and are conversant with the late progress in the industry. However, experts disagree in this field as much as in any other, due partly to the fact that an organ, like any musical instrument, is consciously or unconsciously tied up to past associations which tend to warp judgment. Many conservative organists often will go no farther than to say that in a certain group of builders you can be sure of good work and full acceptance of the responsibilities of a builder.

Our feeling is that any reader who has come thus far with us wants to have an independent basis for personal judgment, realizing that the burden of responsibility for a satisfactory organ cannot be shifted from the committee. It is because of this belief that this book has been prepared.

The "Specifications" for an organ are the obvious and only tangible basis for passing on relative values. In general, we can say that the specifications only tell how much "organ" is to be furnished, that is, they give the factor of quantity without attention to quality. Two points should be watched. One is that too much value may be placed on quantity. A large number of stops has an appeal which it is difficult to resist. In one

case recently, a committee received three proposals, but the consulting organist, who was unusually well qualified, eliminated two proposals, saying that both were offering too much for the price asked and in some way they would have to sacrifice quality. The second difficulty with specifications is that no standard and uniform way of drawing them is followed. Some builders use a different name for the same set of pipes when played from different keyboards. Number of "notes" rather than number of "pipes" are listed. This is legitimate as long as the purchaser understands the practice and makes due allowance when comparing with specifications from another group of builders who, like ourselves, list only the things which actually increase the value of the organ.

A large number of stops is desirable, not for the volume of sound but for the variety of tones which they make possible. An organ with a few stops may be satisfactory as an accompaniment to congregational singing, but as a solo instrument a wide variation in tonal effects is necessary to realize the full grandeur of a pipe organ.

The specifications are only the means of stating the type of stops desired and the approximate size of the organ. When judging value, the *standards* which the builder has for his stops and accessories are the important things for an organ of quality. When a big, heavy tone is called for, will the material for the pipes be adequate, will the scale or relative size of the pipes be in proportion to the size of the auditorium or will volume be secured by increased pressure? Unless the pipes listed on the specifications speak with a *quality* of tone, well blended and of the right volume, the advantage of *quantity* of pipes is, in a large measure, lost. To be assured that the pipes speak promptly and whenever called on is as important as artistic voicing. This promptness is a matter of the "action" or mechanism, which the specifications do not cover.

Our belief is that, while the number of stops is important, it is not the ultimate test of the desirability of an organ. The number of pipes should receive consideration, but the real measure of a fine organ is:

Quality of Tone,
Quality of Service,
Durability.

In the next section we go into some detail on organ tones, but in connection with the specifications, stops should be included so that the tone is built up, starting with fundamental organ stops. The first few stops must be designed to supply a foundation. A house is not a house without foundations, walls, a roof, doors and windows. After these, porches, running water, fireplaces and other refinements are added. The simplest house, if it is to endure, must have an adequate foundation. We build the tone of an organ with special emphasis on adequate foundation and take particular pride in this department of tone in Estey Organs of all sizes. As in designing a house, general custom prescribes the approximate order in which refinements are added, but there is ample room for individual taste when specifying the tone coloring desired in a pipe organ.

Quality of Service in an organ is reliability or dependability or full response of the organ whenever called on. This is distinctly a matter of the workmanship and design and material of the mechanism. A full discussion of the wonderful action of the Estey Organ is not possible. In the section on "Trifles and Perfection," we cover some of the points which will help convince you that our test of acceptance for any action mechanism has been:

Is it simple?
Is it the best way?
Is it reliable?

A pipe organ action has to accomplish so much with elements which are comparatively so unstable, that we spare neither expense nor painstaking effort to make it dependable. The Estey action is probably the most simple and most expensive made, but we will not compromise on this, for over a period of time the reputation of an organ installation depends on reliability and dependability. Tone becomes an accepted fact, but each failure of the action is a source of irritation and expense.

Durability is another test for an organ of quality. The used or second-hand value of organs is very low. To purchase an instrument which will require many new parts or overhauling or replacement in a very few years is not wise buying. Just how much attention and expense a medium quality organ will require of course cannot be estimated. We know the experience many churches have had with organs purchased on a price basis. Over a few years the actual cost, not to mention the trouble, has more than offset the small increase in initial cost of the Estey Organ.

Our own experience on upkeep charges taken from the records of our Service Department shows that under our Yearly Care Contract maintenance costs average less than one per cent a year of the original price of the instrument. This figure includes tuning, regulating and cleaning, which is not a matter of the durability of the mechanism.

We admire the spirit which prompts the manufacturer who advertises that not one of his automobiles has ever worn out. We do not apologize for making with equal pride the same statement about our pipe organs.

To really test the factors of tone service and durability is very difficult. In the final analysis we are selected to build organs for people who are confident that our methods are sound and have stood the test of time, that our material is the best for the purpose and that our integrity is beyond question.

A product and a business should have character, built up as the sum of past performances and policies. There is nothing nondescript about an Estey Pipe Organ; every part is made for it in our factory. With dependability and refinement as the foundation of this organ of character, we have held firmly to some old and tried principles, not lacking courage to adopt as standard new methods of construction. Over a period of years an organization prospers only as it has served, and we have prospered. Our rating, credit, net worth and general standing are not exceeded by any builder of pipe organs. The ownership and control and management have never passed from the family of the founder over a period of seventy-seven years.

We mention these facts briefly because many of our friends have found this a genuine basis for confidence not only that our original contract will be fulfilled, but also that the organ will be maintained in service for a long period of years.

Quality of Tone

MANY times we have heard people exclaim as they inspected a console or the display pipes and casework, "What a beautiful organ!" The eye should be pleased, but the ear supplies the real test. In a matter of tone quality, every listener forms his own conclusions. While there is a general agreement on most matters of tone in an organ, on certain combinations or individual stops tastes differ and seldom are subject to argument. We voice our pipes to a standard we believe pleasing to most people as to brilliance, mellowness, roundness, relative strength and other qualities. The tone we get from the full organ has been the subject of special praise from men whose judgment is respected.

To secure a certain character of tone is a question of the material used, the size, shape, formation at the mouth and "regulating" of the pipe. Many complicated factors enter in, but in general this holds true. "Regulating" is producing the desired volume; "voicing" is insuring quality of tone; adjusting for accurate pitch is "tuning." These operations require not a little technical skill and are accomplished by manipulation of the toe and mouth of the pipe and change of the speaking length. An organ is voiced to a predetermined wind pressure which is expressed in terms of inches.

Estey organs are voiced usually on five-inch pressure. This is relatively low, but experience has shown that better tones are secured than on higher pressures. Higher pressure with no change in the scale of the pipe will give increased volume of sound. To get both volume and quality we build an organ of proportionately larger scale; that is, increase the diameter of

all pipes. It is poor building to get the necessary volume by increased pressure only. "Overblown pipes" can easily be distinguished.

The results of the research work and advances made in tone production by the Estey Organ Company in the last twenty years would take many pages to explain. Patent attorneys state that William E. Haskell, our superintendent, has shown more activity on this subject at Washington over this period than all other builders combined. The results which have been obtained on a number of individual stops can only be appreciated by a demonstration. Some of the imitative stops such as Harp, Saxophone, Clarinet and Oboe, defy detection when played in direct comparison with the instrument imitated.

Two of the basic results of our experiments are of importance enough to justify explaining in the remainder of this section.

Reed Stops

All organ pipes are divided into two general classes, labial pipes and lingual pipes. The main difference between the two classes is the manner by which the vibrations producing the sound are caused. In labial pipes the column of air entering the pipe under pressure is set in vibration by a fixed obstruction at the mouth of the pipe. See figure 1. The arrows indicate the passage of air from the foot of the pipe until it strikes the obstruction at the mouth "A" which causes the column of air to vibrate.

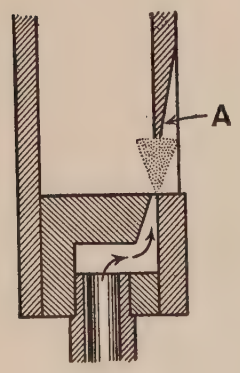


FIG. 1

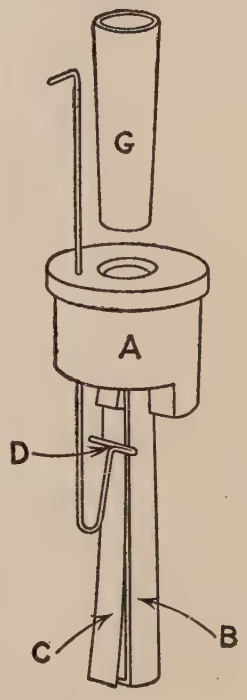


FIG. 2

In the lingual or reed pipe, the vibrations are caused by the air passing through a metal reed, which causes the tongue of the reed to vibrate, thereby setting up sympathetic vibrations in the column of air in the pipe. See figure 2.

"A" is the block in which the reed is set on one side and the metal cylinder or pipe "G" on the other side. "B" is the reed or échalote, a slightly tapered tube of soft brass closed at its lower and larger end with a disc of the same metal soldered on. Along the top of the tube a perfectly flat and smooth face is formed by the file and in this face an opening of special form is made. "C" is the tongue or languette, a thin, narrow strip of fine elastic brass, shaped so as to accurately cover the face of the reed. The tongue is curved slightly away from the face of the reed in order to allow the air to pass under it, setting up vibrations.

"D" is a tuning wire which is a strong spring preferably of phosphor bronze. By raising or lowering this spring on the tongue of the reed, the pipe is tuned. The spring must be strong enough to hold the tongue at the point of contact closely to the face of the reed. To lower the pitch of the pipe, more of the tongue is allowed to vibrate; that is, the tuning wire is pulled up. To make the pitch higher, the tuning wire is lowered. The pipe is in tune only as long as the spring "D" holds its position on the tongue of the reed. There is great likelihood of its going out of tune, due to changes in temperature causing the metal to expand or contract enough to move the spring out of position. The least shock or jar will have the same effect and, even without these external causes, the spring will, in time, lose its tension and move its position.

Reed pipes give the character of tone in an organ similar to the reed and brass instruments of the orchestra. These are the tones which give the variety, brilliance and assertiveness neces-

sary to a properly appointed organ or orchestra. Every pipe organ ought to have at least one stop of reed character. The smallest specification is admittedly incomplete without this character of tone. In a very large organ with a great number of stops of all characters, it is absolutely necessary that the services of an expert tuner be employed at frequent intervals to keep the entire organ in condition and with such instruments the added care of the reed division is not a great added expense. But in small and medium-sized organs which would seldom require attention were it not for the reed stops, this tendency to slip from tune is a source of special expense and trouble.

Reedless Reed Stops

With this last thought in mind, the Estey Organ Company, several years ago, began developing tones of reed character produced by labial pipes. The first stop produced was the labial Saxophone. This pipe is a wood pipe without any reed, the air being set in vibration by the fixed obstruction at the mouth, like all other labial pipes. The practical success of what we first supposed an experiment was so tremendous that we immediately decided to go on with investigations in an attempt to produce other tones of the reed family from labial pipes. The next stop was the Oboe and its success was equally as great as that of the Saxophone. Since the Oboe and Saxophone, we have brought out the reedless Clarinet and Tuba. These four stops give us practically every quality of reed tone from labial pipes.

Each one of these stops has been subjected to the most rigorous test. For instance, a Saxophone, Oboe and Clarinet consisting of our labial pipes were placed in an organ containing lingual (or reed) Saxophone, Oboe and Clarinet. An audience of organists unfamiliar with our investigations was assembled

and the organ played, first with the lingual and then with the labial reeds, and vice versa, and the audience could not tell which were the lingual and which the labial pipes. The audience agreed, however, that all the stops were faithful examples of the character of tone they represented, proving that the lingual pipes had not been "dressed up" to cover any peculiarity of tone in the labial pipes. In other words, it was proved by this test that we had developed the "Reedless Reed Stops" to a point of perfection where improvement, as far as duplicating the lingual stops was concerned, was no longer possible. The Estey Organ Company alone is able to furnish this patented type of stop.

People may ask, "Why all this fuss about producing a character of tone in a different way from that in which it has always been done?" Just this; with these labial reed pipes a church can have the benefit of reed tones in its organ without the inconvenience and expense always associated with lingual stops. This new type of pipe will stay in tune as long as any other labial stop. Once a year a tuner may go over the organ and the chances are he will find the labial reeds in tune just as he left them a year before.

Recently the following appeared editorially in the "American Organist":

"Undoubtedly the reedless pipes of Mr. William E. Haskell are the greatest achievement in individual tone of the past five years. Their tone quality is at last about as nearly perfect as can be reasonably hoped for or desired, but their ability to weather the war of the seasons is their greatest asset to both player and hearer alike—doubly so in the smaller cities where organ tuning is a waste of money to be indulged in only once every three years."

Mr. Haskell has been our superintendent for many years.

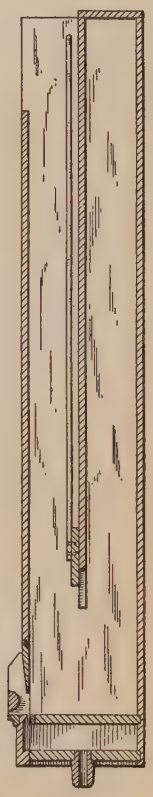
Patent Bass Pipes

While at work on the reedless Clarinet one of the most important discoveries in tone production which has been made in the last fifty years was developed. In an attempt to qualify the tone of a particular pipe, a cylinder was inserted in the pipe with the most astounding results. It was immediately discovered that this cylinder, while not changing the tone quality of the pipe at all, did materially change the pitch. It was found that an organ pipe of any sort with a cylinder of certain proportions inserted, gave a tone the pitch of which was twice the length of the pipe from mouth to top. As an example, let us take a Saxophone pipe of 4-foot pitch. When we insert a cylinder, we secure the same true Saxophone tone of 8-foot pitch. Likewise an 8-foot Saxophone pipe with the proper cylinder inserted gives a true Saxophone tone of 16-foot pitch.

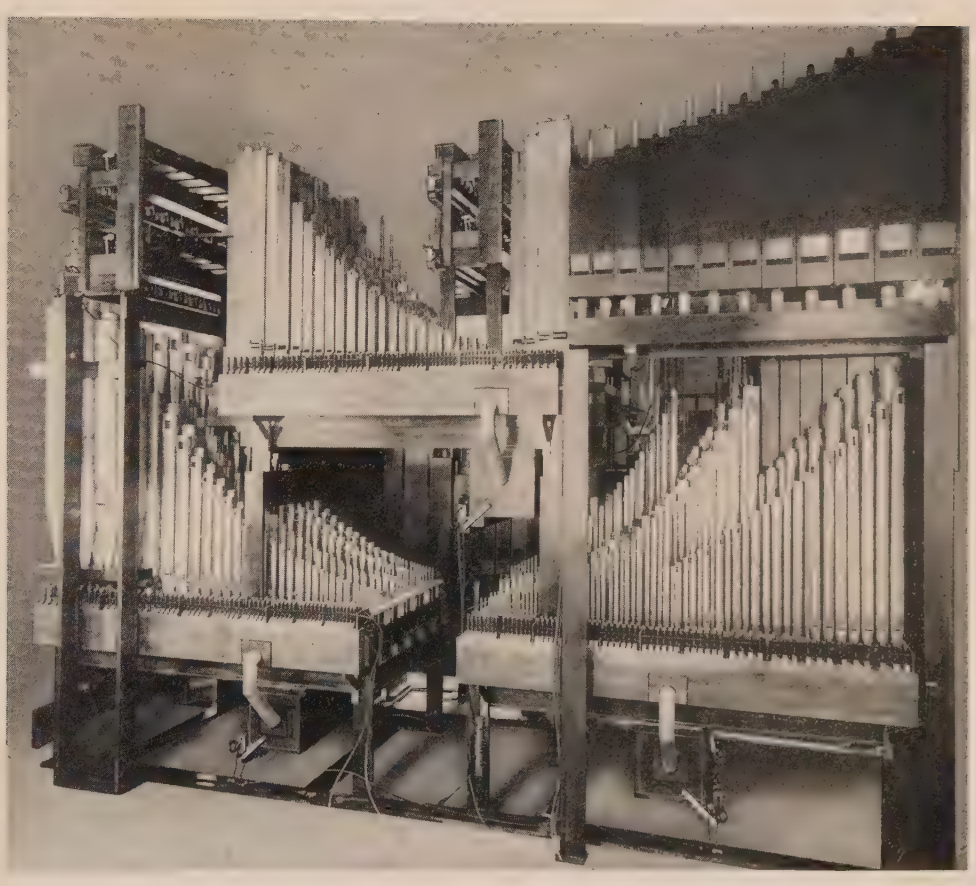
Patent Bass Pipe

This important discovery enables us to place pipes of 16-foot pitch in a height of a little over eight feet without resorting to the damaging practice of mitering or of laying the pipes horizontally.

Many things about tone in connection with pipe organs cannot be explained by the most noted physicists in the country. From an organ lover's standpoint, this does not matter. The tonal results we have been getting over a period of years are highly satisfactory and have given unnumbered thousands a degree of musical enjoyment excelled by no other instrument.



Patent Bass Pipe



INTERIOR OF A THREE-MANUAL ORGAN

This photograph illustrates how a relatively large organ can be accommodated in a limited space. In this case the pipes are arranged chromatically in order to allow the suspension of the Choir organ chest between and above the Great and Swell chests. The Estey Patent Bass pipes provide the open sixteen-foot tone without using mitered pipes, although the organ chamber is but eleven feet high.

Mechanics of Control

A MOTOR car, however powerful its engine or beautiful its line and finish, loses in value and reputation unless it responds to the various buttons, pedals and levers which control it. Unless the mechanical controls of a pipe organ operate efficiently week in and week out, the instrument is not satisfactory. That part of the organ which actuates the valves is called the "action" and must do considerable work in response to the organist's operation of keys, stop tablets, couplers, combination pistons, swell and crescendo pedals.

A key must instantly open or close all valves controlling the pipes of corresponding pitch in every stop on that division of the organ, although only those pipes speak which have had compressed air admitted to the chest for that stop.

A stop tablet when operated admits or shuts off the air for the chest of the stop it controls.

The combination pistons throw on or off any predetermined group of stops just as a stop tablet governs a single stop.

A coupler throws into gear an extremely ingenious mechanism which causes a pipe an octave above or below the depressed key or on another manual to speak at the same time.

The swell pedals open and close the shades or leaves in the boxes enclosing the various divisions of the organ, thus controlling the volume of sound.

The crescendo pedal as it is depressed brings on one stop after another until the full organ is speaking, or starting with the full organ will cut the stops out one by one.

These are the principal "controls" which are centered at the

console for the organist. To really know the mechanisms back of the controls, the conditions these mechanisms have to face in use and the reason for the design and material employed to meet these conditions, would take several days at the factory.

Two types of action are used in modern organs to get the above results from the controls, tubular-pneumatic and electro-pneumatic.

Tubular-Pneumatic Action

We stand firmly as the champion of tubular-pneumatic action when it is possible to use it. In general, a tubular-pneumatic action can be used if the console is within twenty feet of the organ. Over a greater distance compressed air will not operate satisfactorily except with relays, which are undesirable. Perhaps our belief in the fact that pneumatic action *should* be more reliable than electric supplied the inspiration to build our pneumatic action so that it exceeds any electric action in point of service and reliability, and equals electric action for rapidity of speech and repetition.

The Estey pneumatic action arouses unqualified admiration from all organ tuners and service men. Considering the task to be performed, this mechanism is extremely simple. Compared to the average electric action, it is simplicity itself. We are especially proud and confident of this action since it has proved to be a principal factor in building our reputation for dependable and honestly made pipe organs.

Electric Action

An electric action has its field and definite advantages. With it, a console may be placed at any distance from the organ chamber.

Numerous attempts have been made to play an organ directly by electricity, that is, doing away with the pneumatic parts and using electricity to operate the valves admitting wind to the pipes. To date, playing an organ in this manner never has proven practical because so much power is required to operate the valves, especially for the larger pipes of an organ, that too strong current is needed and numerous complications are set up. Immediately the problems of induction and switch control are encountered.

We have simplified to the greatest degree the electric part of the action, for it is conceded that an electric organ to be operative must be primarily a pneumatic organ with some of the first steps in the action operated by electricity. In other words, we use electricity simply as the transmission line from the console to the organ instead of the tubes in a pneumatic organ. Our pneumatic console is identical in every respect with our regular electric console except for the first step, or console intermediate as we call it, which in the case of a pneumatic organ provides wind for a tube and in an electric organ makes the contact. There is one wire from the contact to the magnet controlling this particular note on the keyboard and there we stop. Everything else is operated by compressed air. This construction is the most reliable in every conceivable manner, for as long as the tube or channel remains intact, compressed air will operate without heating or liability of getting out of order. All coupling devices, combination actions and other mechanisms are controlled by compressed air.

In fact, there is no such thing as an electric organ. It is electro-pneumatic, which means that to the pneumatic organ there is an added element of electricity which, due to its inherent characteristics, is less reliable than compressed air. Compressed air will work as long as the blower operates or as long as there

is a tube or channel for it to go through, but electricity depends upon certain added requirements, a generator, electric contacts and wires which must be tight at both ends, and which burn out and short circuit. We do not mean by the above to deprecate the use of electricity in an organ, but we do mean to say that an electric action should be used in its simplest form.

Estey Electric Action

The essential features of our electric action are switches, magnets and cables.

The switch, which is closed when a key is depressed, is composed of two silver contacts. These are of large area and provide so large a surface for the make and break of the small amount of current used that it assures long life and freedom from corrosion. Our coupling device is pneumatic, which avoids multiplying the amount of current used, thereby eliminating an increased current at the contact, causing sparking and excessive wear.

In an electric organ, magnets form a most important part of the action.

The magnets which are used in all Estey organs are noteworthy in that they are wound, completely manufactured and assembled at our factory. Their superiority over the magnets which can be bought is great. Magnets supplied by parts manufacturers are invariably of die casting, which means that they are soft, liable to bend and the interior portions of the valve in the base are not smooth as in a machine-made product.

The bases of our magnets are machined from solid brass, all holes are bored, the valve seat finished by a special tool and every moving part is machined to a one-thousandth of an inch. With this method of construction there is no possibility of the armature sticking and causing a cipher.

In fact, our magnets represent high class, accurately machined product, embodying a principle that does not seem to have been discovered by any of the makers of the horseshoe type. The magnets are smaller than any other type, can be placed in a very accessible position and at the same time be so placed that they will not be damaged by a person moving about within the organ.

While the building of our own magnets is a comparatively expensive operation, we feel that the freedom from magnet ills which the use of our own type gives us is well worth the extra expense. This extra expense is certainly a safeguard to the purchaser, for it gives a steady, reliable device at the vital part of an electric action.

An Efficient Console

The control of the action centers at the console or keydesk. We are installing in many places a new console of advanced ideas which has many points of merit. Following is the line of thought through which the Luminous Stop Console was developed.

The function of a pipe organ is to produce music. In order to properly interpret the composer's dream, the performer must have the instrument under perfect control. Ease of control makes possible a variety in interpretation so necessary if the subtleties of the composer's art are to be brought out. Ease of control is one of the main requisites of a pipe organ for which organ builders have been striving in the past few years.

The modern electric console is, in reality, an electric switchboard containing the keys and stop tablets which open and close electric circuits which in turn operate pneumatic valves controlling other mechanisms and the pipes. Bringing the keydesk to this state of development has taken time and patience over a long period of years. Several months ago, realizing that most

of the advances in this part of the instrument in the last twenty years had been in the nature of refinement without a real forward step, we proposed to our experimental department the following idea:

"Forget that you have ever seen a console. Forget everything but the results to be effected by the musician while playing. Start with these as the fundamentals of your problem and design a console which will enable an organist to produce artistic effects with the greatest ease and speed. With this must go simplicity of construction to reduce to a minimum mechanical difficulties. In other words, design a console which will incorporate recent advances in any science or industry. Start at the ground and build, without feeling tied down to conventions or previous practice in organ construction."

An analysis of the requirements for a more efficient keydesk showed certain fundamentals necessary:

Ease of operation,
Visibility,
Simplicity of construction.

By ease of operation we mean greater speed and ease of manipulation of the stop controls and especially greater all-around convenience to the organist. Visibility not only referred to arrangement in a small area of stop controls, but also ease in distinguishing between those stops which are in an "on" position and those in the "off" position. Simplicity of construction seemed very important to us. Whereas we might accomplish the first two fundamentals, the accomplishment would be useless at the expense of a bulky and complicated mechanism crowded into the console and subject to intricate and numerous adjustments.

The Estey Luminous Stop Console

Success in designing a stop piston which throws on or cancels with the same "finger tap" motion, making the head of the piston luminous when in the "on" position, is perhaps the improvement responsible for most of the advantages this new console offers. These compact luminous buttons or pistons provide increased ease of operation and better visibility.

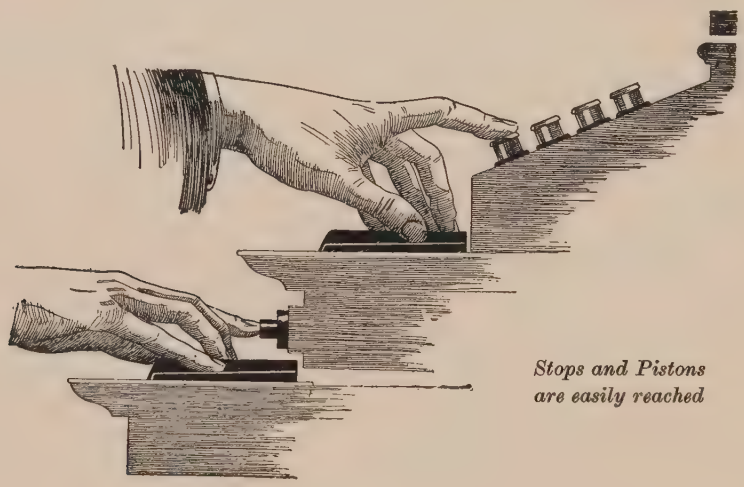
The mechanism of the stop action, except the contacts, has been removed to the organ chamber, for the first time breaking away from the mechanical difficulties of placing this mechanism in the console itself. Thus, the Luminous Stop Console is mechanically the simplest unit possible.

It should not be presumed that this new type of keydesk is in the least a revolutionary change. The functions of the console remain as always. The control over these functions has been simplified mechanically and, to a great degree, enhanced in efficiency. In the first place, the size of the keydesk has been much reduced; that is, the necessary size has been reduced. If the purchaser prefers a large console with rich ornamentation, it can be furnished, but that has nothing to do with the space required. The mechanical parts have been so reduced in number that actually there is nothing in the console itself except the keys, the contacts which are closed by depression of the keys and the cables which carry a wire from each contact. No wind is required in the console, which makes a portable unit of very light weight, provided cable of sufficient length is specified.

The conveniences of this new type of keydesk cannot be overemphasized. The compactness of the stop controls, visibility of stops affected by the pistons, the sharp contrast between those stops "on" and those "off," the speed of operation of the pistons themselves and the fact that the stops brought on

by combination pistons are so easily distinguished all work toward the organist's convenience.

The stop controls themselves are pistons with heads of a translucent material on which the names of the stops are engraved and under which are placed electric lamps. These stop pistons, which correspond in duty done to the usual tilting tablets, can be grouped so that more than fifty can be placed in the space covered by one's hand. The pistons can be arranged as may be desired. For instance, all the 16-foot stops in a division may be placed in one row, up and down or across. Again,



Stops and Pistons are easily reached

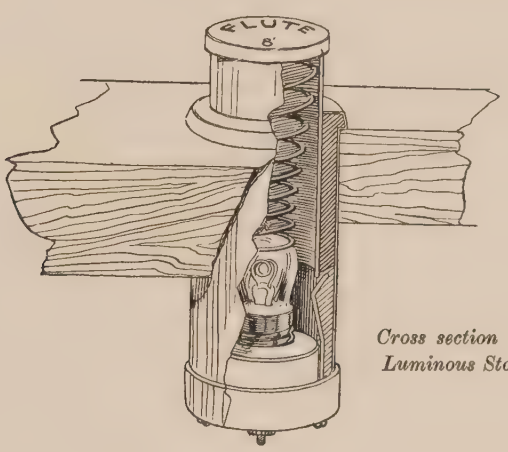
all the Strings or Flutes or Reeds may be placed in one row, across or up and down. Whatever arrangement may be selected will be quickly memorized and the organist will be able to bring on or cancel the desired stop as rapidly as a typist selects the proper letter from those upon the keyboard of her machine.

The stops are brought on or cancelled by the same motion, which is also the motion used in playing. The springs in the pistons are so regulated that the pressure required to depress one and bring on a stop is exactly the same as that necessary to

depress a key to the point of contact. Blank spaces between the stop pistons of different divisions provide effective grouping of different divisions of the organ.

Consider, for a moment, a typewriter. By adopting the scientific arrangement of the keys of a typewriter or an adding machine, we have put the control of stops on a basis which is admitted to be the speediest and most efficient of any arrangement of small units under the control of the hands.

Tilting tablets not only require an opposite motion to bring on and cancel, but the visible difference between those stops



Cross section of Luminous Stop

"on" and those "off" is small. When several tablets adjacent to one another are all either "off" or "on," it is very difficult to be sure at a glance in which position they are. With our illuminated pistons, however, the contrast between the stops "on" and "off" is great. If the piston head glows, it is in the "on" position; if it does not glow, it is in the "off" position. The lamps which are used in these piston heads are especially designed. They are very small, but at the same time of great durability and have given entire satisfaction.

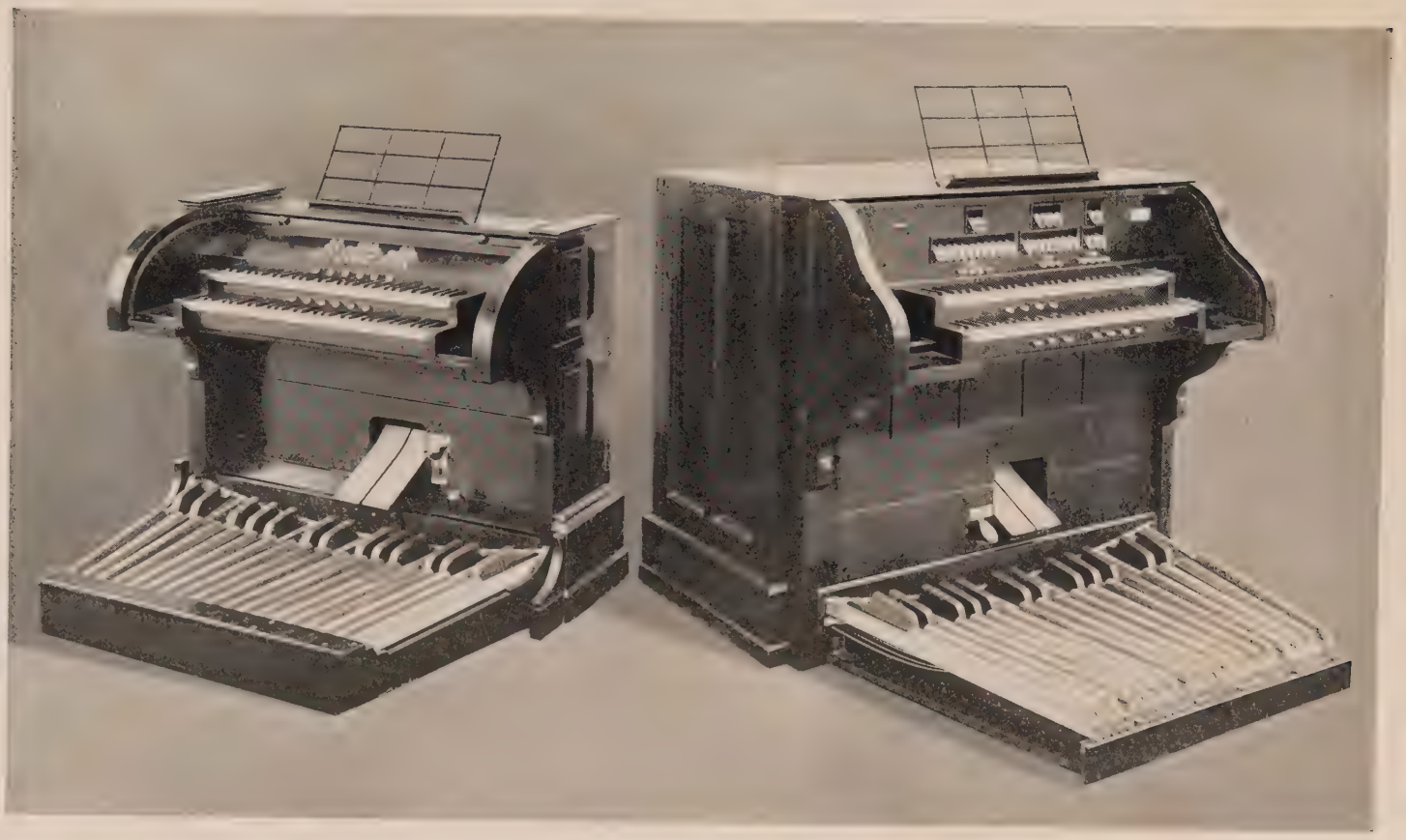
The Crescendo Pedal is designed to bring on the lights in the

stop pistons or extinguish them as the stops are brought on or cancelled. Here is an advantage never before offered an organist.

Combination Pistons also make luminous the stops they control. After operating the piston, if the organist wants slightly different tone, individual stops can be added to or dropped from the combination without making a change in the "set" of the piston.

The addition of stops to an organ equipped with our new console is a most simple matter. No fine, troublesome and time-consuming work on the keydesk is necessary. Simply bore a hole in the name board, insert one of our piston units, attach a wire and the job is completed as far as the console is concerned.

The organists who have this Luminous Stop Console are most enthusiastic over them and report that visiting organists express first surprise and then admiration for the way we solved the problem "in a manner so bold that one is amazed at its simplicity."



A Luminous Stop Console and a Tilting Tablet Console

Relation of Trifles to Perfection

IF any industry illustrates the saying that "Trifles make perfection, but perfection is no trifle," it is true of organ building. We mentioned this thought to a man who had been associated with organ building for nineteen years, as he was inspecting our plant. His reply was, "If these workmen are typical of the Estey personnel, I doubt if an Estey man will admit that *anything* about a pipe organ is a trifle."

The outstanding point carried away by visitors to our plant is the quality of material, workmanship and finish put into every part of the instrument, whether in plain sight or tucked into the most obscure corner. The pride of craftsmanship is an important element in keeping the trifles at maximum quality. This pride is an actual factor in our work and is due in large part to the fact that every part of the organ is made in Brattleboro. Nothing suggesting an assembled organ is permitted. A glance through our trade papers would show between fifty and seventy-five firms whose principal business consists of making keys, pipes, magnets, actions and other parts for "organ manufacturers." As far as the Estey Organ Company is concerned, these suppliers could all discontinue business tomorrow.

A trip through the factory is what really convinces one of the care we take with trifles. Scattered over these pages are references to little things which indicate great attention to design, method and material. Following are further points for consideration.

The boards with deep grooves in them, serving as wind conductors, and termed "groove boards," are dipped in white lead and oil to fill up the pores of the wood and prevent leakage of

wind from one groove to another. Elimination of this leakage is a vital factor and a source of great help to an organ tuner.

Pipe-metal should be of various compositions according to the stop to be made. To insure a ready supply in exactly the percentage of tin and lead desired, we cast and roll the raw material ourselves. An Estey metal pipe is never skimped in weight or adequate quantity of tin when heavy proportions of this relatively expensive metal are called for.

When a series of contact points are to be maintained at a uniform and set distance apart, a heavy bar of steel is used to prevent even the slight warping to which in time a piece of wood might be subject.

The wind chests are not fastened with ordinary wood screws, but with long machine screws with spring washers and bolts. The spring washers maintain a tight joint in spite of the slightest change due to atmospheric conditions.

Every precaution is taken to exclude foreign matter from clogging working parts. Valves are made large and valve seats designed so as to attain the irreducible minimum of trouble from this source. A fine mesh cloth screen over the magnets and valves in the wind chest protects them from the many particles which over a period of time do get into an organ.

The lumber used in various parts of the organ is an item which is of special importance in connection with durability and length of service. Birch, maple, white wood, pine and mahogany are the principal varieties. Each has its own qualities, making it the best selection for certain purposes. The quality required, not the cost, determines what is used in any part of an Estey Pipe Organ.

The correct treatment of the lumber before working is as important in this industry as in any fine woodworking or cabinet-making trade. Our lumber yard at all times resembles a large

retail lumber dealer's stock, as slow air drying before treatment in the kilns is most desirable. The practice of placing lumber direct from the freight cars in the kilns is not to be condoned.

The final step before packing and shipping is to entirely assemble and erect the complete organ at the factory. We believe no other builder is doing this, but it means that our instruments go out complete, accurate as to parts fitting together and thoroughly tested and inspected. This extra step at the factory enables us to complete the actual installation of an instrument in a comparatively short time. This cuts to a minimum any interruption in the regular use of the church. Our organ is completely built at the factory—our men re-assemble it in its place in the church.

A final point, often overlooked, is that our Field Service Department is the largest maintained by any builder. Our own regular staff men install all our instruments. We recognize a responsibility to users for supplying a skilled and reliable tuning and regulating service. On our Yearly Care Agreement, these same experts visit the organ twice a year or oftener, thus insuring a high quality of maintenance care to Estey owners.

We cannot say that the points above and other "trifles" are sufficient for us to claim to have achieved perfection in our field. We do believe we have approached practical perfection. With this as our aim, we have made certain definite advances and we propose to make past accomplishments stepping stones to further progress.

Ideals and an Organ Factory

THE thoughts in this section will appeal only to those who believe that the human factor and contentment in industry are bigger than generally recognized. The intangible spirit permeating an organization of any kind certainly is reflected sooner or later in the product.

Our firm is one of a group which often is referred to as an "old New England institution." In a large measure, the factors which have made it so are summed up in the following three sentences from a very wonderful book, "Annals of Brattleboro, Vermont."

"Organ making calls for a special and fine quality of workmanship; it follows that the majority of men in the employ of the Estey Organ Company have been able, intelligent, industrious, owning their own well-ordered homes, and taking their share as valued citizens in the common life. It is to the far-seeing wisdom and practical beneficence of Jacob Estey, carried on through the management of his successors, that this great industry has proceeded for over seventy years without obstacle from labor agitations. Many have given all their working days to the Estey Organ,—thirty and forty years; one, fifty-six; another, fifty-nine years—becoming veterans in the service."

Factory conditions do approach the ideal. Brattleboro is a typical New England "banking town," in a very attractive part of southern Vermont on the Connecticut River. The plant is on a hill above the town. Out of every window green trees, lawns and neat homes are seen. Directly back of the building in which the voicers work is a shady forty-foot bank covered with trees, ferns, wild flowers and bushes. One of our pipe

voicers says that bank means more to him than his pay envelope. A visitor once remarked, "If good organs are built anywhere, they should be built here." The buildings are long and narrow, which permits each workman to have his own bench beside his own window. At least forty feet separates all buildings, so there is an abundance of light and air. We mention these things because they do affect labor, and labor turn-over is an acknowledged element in production and quality. Many trades and arts are represented in an organ factory and a high percentage of the workers must be real artisans and craftsmen. In this group labor turn-over does not run over one per cent a year. Many of them have personal recollections of the founder and founder's son.

Like other "old New England institutions" our growth has been slow and steady. To quote further from "The Annals of Brattleboro, Vermont," covering the early days of this business when melodeons were its principal product:

"Mr. Estey took on himself the duties of salesman and for several years he personally sold the whole product of the modest factory. He used to load his wagon with melodeons and strike out, it might be across the mountains into Eastern New York, then perhaps Northern Vermont into Canada and come home through Western New Hampshire, varying his beat as the trade prospects might indicate."

The week this is written, a friend brings a story of discovering in an old house in New Hampshire an Estey melodeon in perfect condition and tune with a date on the name board, 1856. The first Estey pipe organ is still in use in a church here in Brattleboro.

With seventy-seven years of tradition and accomplishment to live up to, with several thousand owners of pipe organs who will be users for years to come and look to us for continuous

service and with a personnel of several hundred rather definitely committed to this company for their business lifetime, we find no difficulty in continuing a policy of aggressive conservatism and the ideals of service which will allow us to maintain these three things which are at the same time assets as well as responsibilities.

The Economy of Excellence

WE have been especially fortunate, because of conditions outlined in these pages, in that churches and societies have come to us stating that they were satisfied we knew how to design and build good organs at a fair price and asking us to tell them in every detail exactly the requirements for their building. Price, in cases like these, is an item secondary to securing an organ of correct specifications and scale. Unless the conditions of installation are out of the ordinary, our representatives arrive at the cost of a specification from figures on the standard price scale which they all carry. Factory costs in organ building are not easy to keep. Nearly all of the business shipwrecks in this industry have been due to this fact. We have an excellent cost system and for each organ we allow a standard percentage of profit. Our prices are set so that they take care of material and labor cost, reasonable overhead and fair profit, not on a basis of what the traffic will bear.

The ideal method of purchasing an organ is to have a reliable builder make his recommendations as suggested above. Often this is not possible and the basis has to be that a certain amount of money is available and no more. As set forth in the section "Specifications as to the Measure of an Organ," we strongly urge an organ with few stops which makes clear its claim to quality rather than a larger organ which stresses price advantage. If necessary, plans can be made to add stops at some later time.

Real economy in purchasing is buying an organ which will meet the test of time. A substantial instrument with the de-

signing right and the best of material will last many decades at a very small average annual maintenance cost. An organ is a delicate and complicated machine and will not stand against constant usage, varying temperature and atmospheric conditions when quality is compromised, except at an increased annual cost for mechanical service which would soon eat up any initial saving.

A review of the points offered in the Estey Organ and covered in previous pages will emphasize the idea of the economy to be acquired through excellence. The mechanical parts of our tubular-pneumatic or electric actions are, without reservation, the best that we know how to make. The new luminous stop electric console is a marvel of simplicity and convenience and absolutely in a class by itself. In the department of organ tones we offer individual stops of most distinctive and pleasing quality. The Estey Reedless Reed Stops and Patent Bass Pipes are exclusive features of measurable value in the cost of maintaining the organ. Complete erection and test at the factory before shipment, a trained and expert staff of Field Service Men and back of all these a firmly established, financially sound and responsible company insure economy through maximum value in an honest product. We feel that our designers have kept us ahead of the field as we are envious of no patents on special features; on the other hand, a number of desirable points are our own exclusively.

If we have seemed to talk quality to excess in these pages, perhaps it is because quality is the foundation of our philosophy. However, we have not reached the point where we have written or consciously formulated anything resembling a business Creed. We do count ourselves fortunate in having throughout the organization, due to tradition and to stability of personnel, a living creed of honest product through excellent

design, sound material and skillful labor. We have tried to avoid boasting or unfair statements and have said less about our product than we could, feeling that the reader with the general knowledge of the art included herein will be impressed with the Estey Pipe Organ.

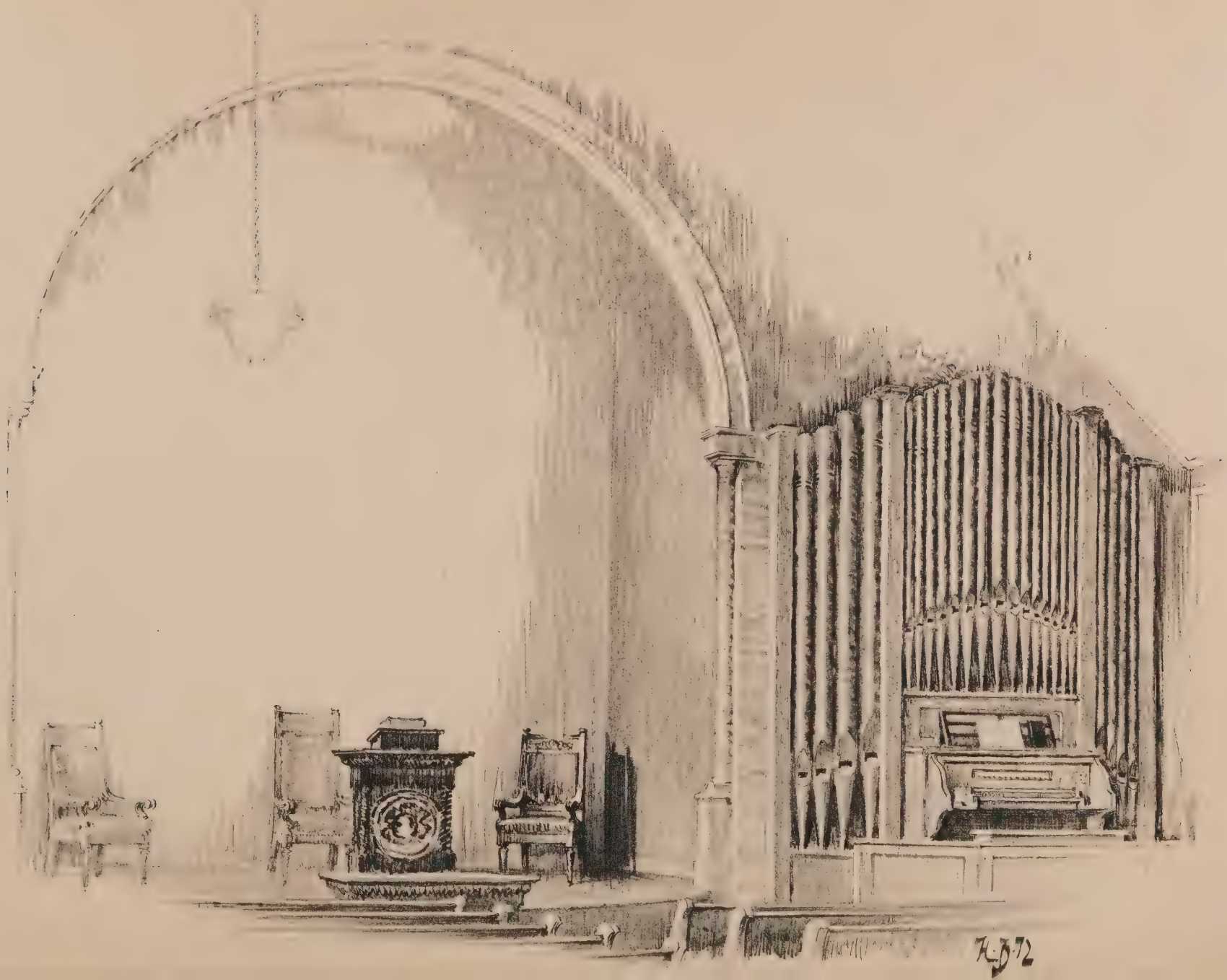
If you are interested in a specific proposal for a new organ, we would like to offer our help and the assistance of our representatives and, within the limits of good business practice, will go far and aggressively after a commission to build an organ. Past performance and tradition alone will not maintain any business. We will welcome a chance to show you the service our experience can be in designing and building your Pipe Organ.

Case Designs and Specifications

MANY church organ installations require some casework which, with the display pipes, must be designed and built to accord with the general architectural treatment of the auditorium. The amount and design of the case and ornamental pipes should be kept in proportion to the size of the organ. Beyond a certain point, the money that might be expended on casework had better be invested in additions to the organ itself.

The casework in every church installation is an individual problem and is constructed from careful measurements and with particular thought to a harmonious result. In the following pages are several suggestions of the appearance of present day designs of case construction. Each illustration is made from an Estey organ in actual use. We offer these pencil sketch reproductions as they give a more satisfactory idea of the real effect than photographs of church interiors.

Opposite each sketch is a suggested specification for a well-balanced organ of a size appropriate to the case. There is nothing fixed about any of the designs or specifications and either is independent of the other.



A SPECIFICATION FOR A TWO-MANUAL ORGAN WITH EIGHT STOPS

GREAT ORGAN

Name of Stop	Pitch	Material	Pipes
1. Open Diapason	8 ft.	Metal	61
2. Dulciana	8 ft.	Metal	61
3. Melodia	8 ft.	Wood	61

4. Great to Great 4 ft.
5. Swell to Great
6. Swell to Great 4 ft.
7. Swell to Great 16 ft.
8. Great Unison Separation ("on" and "off" Piston)

SWELL ORGAN

9. Salicional	8 ft.	Metal	61
10. Stopped Diapason	8 ft.	Wood	61
11. Flute Harmonic	4 ft.	Metal	61
12. Oboe	8 ft.	Metal	49

13. Swell to Swell 4 ft.
14. Swell to Swell 16 ft.
15. Swell Unison Separation ("on" and "off" Piston)

PEDAL ORGAN

16. Bourdon	16 ft.	Wood	32

17. Great to Pedal
18. Swell to Pedal
19. Pedal to Pedal 4 ft.

PEDAL MOVEMENTS

Great to Pedal Reversible — Balanced Swell Pedal — Balanced Crescendo Pedal

MECHANICAL ACCESSORIES

Combination Pistons adjustable and visibly affecting the stop tablets:

Two affecting Great and Pedal — Three affecting Swell and Pedal — Swell Tremolo

Wind Indicator — Organ Bench with Music Compartment

SUMMARY

	Stops	Pipes
Great Organ	3	183
Swell Organ	4	232
Pedal Organ	1	32
Total Speaking Stops and Pipes	8	447
Couplers	11	
Pedal Movements	3	
Mechanical Accessories	8	

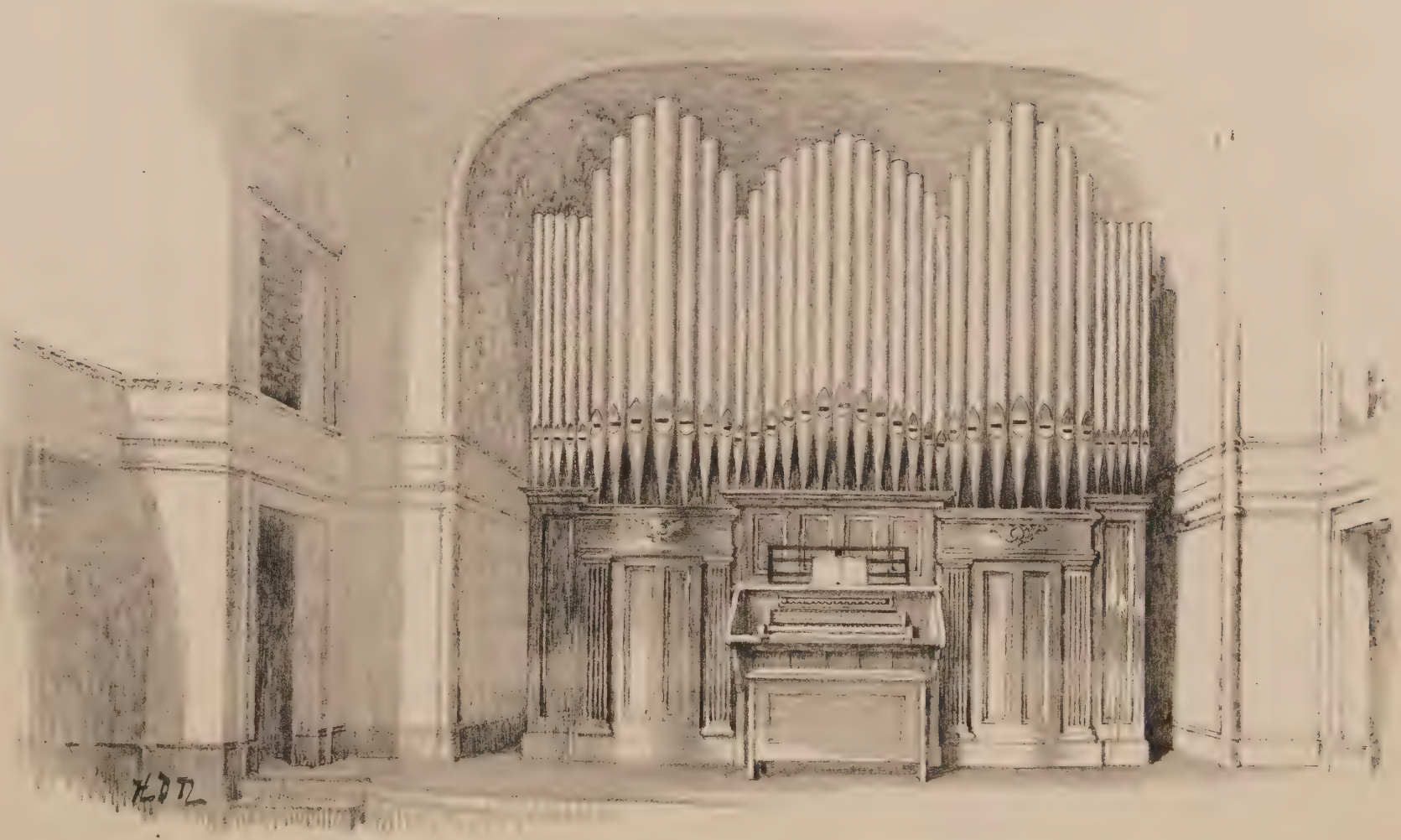


PLATE. 2

A SPECIFICATION FOR A TWO-MANUAL ORGAN WITH TWELVE STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes		Name of Stop	Pitch	Material	Pipes
1.	Open Diapason	8 ft.	Metal	61	3.	Melodia	8 ft.	Wood	61
2.	Dulciana	8 ft.	Metal	61	4.	Flute d'Amour	4 ft.	W. and M.	61

Three Combination Pistons affecting Great Organ Stops, Pedal Stops and Great Organ Couplers

SWELL ORGAN

5.	Bourdon	16 ft.	Wood	73	8.	Stopped Diapason	8 ft.	Wood	73
6.	Open Diapason	8 ft.	Metal	73	9.	Flute Harmonic	4 ft.	Metal	73
7.	Salicional	8 ft.	Metal	73	10.	Oboe	8 ft.	Metal	61

Three Combination Pistons affecting Swell Organ Stops, Pedal Stops and Swell Organ Couplers

PEDAL ORGAN

11.	Bourdon	16 ft.	Wood	32	12.	Lieblich Gedackt (12 notes from 5)	16 ft.	Wood	20

Three Universal Combination Pistons affecting all Stops and Couplers

COUPLERS

Great to Great 4 ft.	Swell to Great 16 ft.	Swell to Swell 16 ft.	Pedal to Pedal 4 ft.
Swell to Great	Swell to Swell 4 ft.	Great to Pedal	Swell Unison Separation ("on" and "off" Piston)
Swell to Great 4 ft.	Great Unison Separation ("on" and "off" Piston)	Swell to Pedal	

PEDAL MOVEMENTS

Great to Pedal Reversible — Balanced Swell Pedal — Balanced Crescendo and Diminuendo Pedal

MECHANICAL ACCESSORIES

Combination Pistons visibly affecting the stops, double acting and adjustable at the bench:

One Zero Piston cancelling all stops and couplers — Swell tremolo — Crescendo Indicator — Wind Indicator

Organ Bench with Music Compartment

In place of Pistons noted above there may be Nine Universal Pistons affecting all Stops and Couplers

SUMMARY

	Stops	Pipes
Great Organ	4	244
Swell Organ	6	426
Pedal Organ	2	52
Total Speaking Stops and Pipes	12	682
Couplers	11	
Pedal Movements	3	
Mechanical Accessories	10	

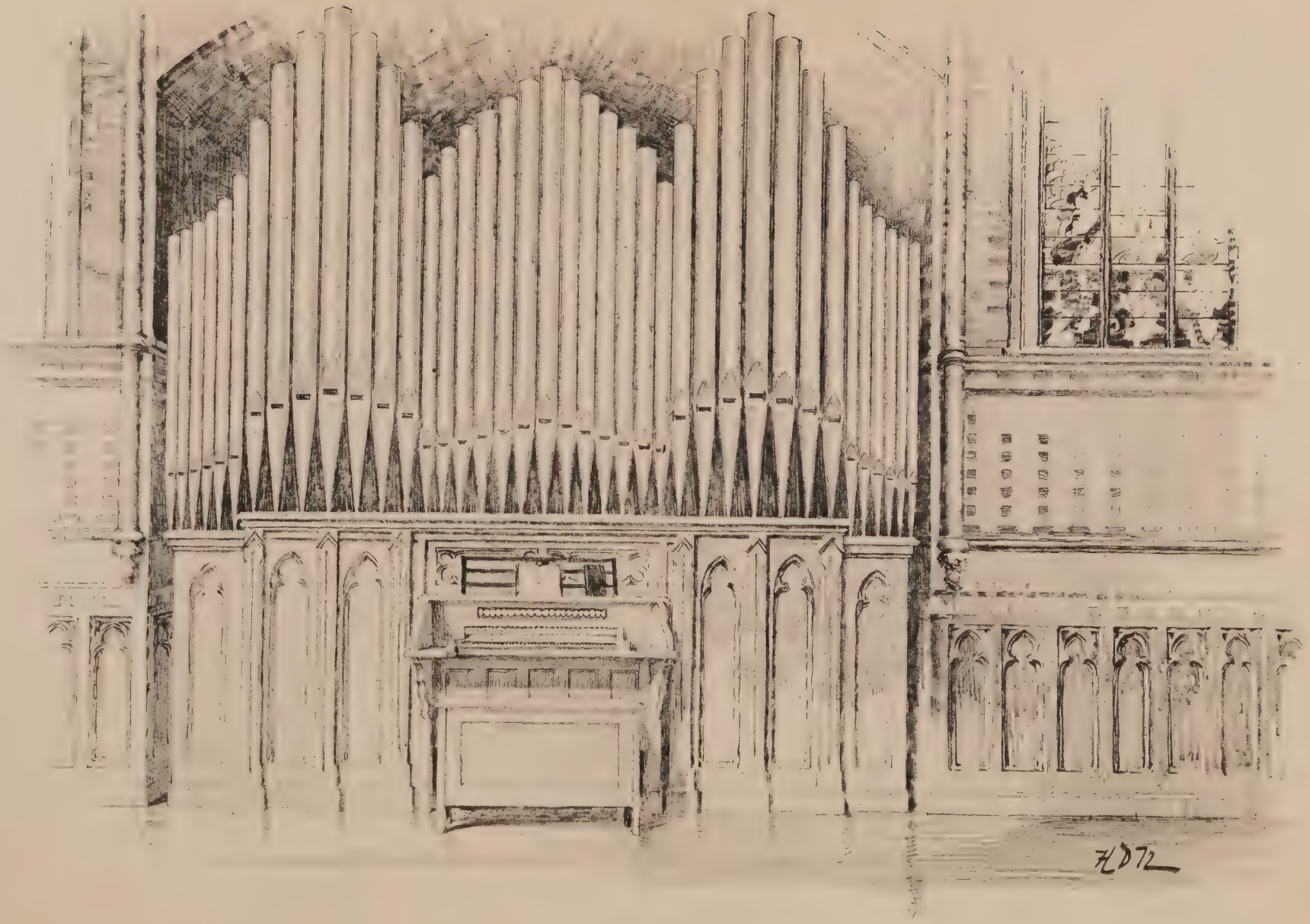


PLATE 3

A SPECIFICATION FOR A TWO-MANUAL ORGAN WITH FOURTEEN STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes		Name of Stop	Pitch	Material	Pipes
1.	Open Diapason	8 ft.	Metal	61	3.	Melodia	8 ft.	Wood	61
2.	Dulciana	8 ft.	Metal	61	4.	Octave	4 ft.	Metal	61

Three Combination Pistons affecting Great Organ Stops, Pedal Stops and Great Organ Couplers

SWELL ORGAN

5.	Bourdon	16 ft.	Wood	73	9.	Stopped Diapason	8 ft.	Wood	73
6.	Open Diapason	8 ft.	Metal	73	10.	Voix Celeste	8 ft.	Metal	61
7.	Salicional	8 ft.	Metal	73	11.	Flute Harmonic	4 ft.	Metal	73
8.	Aeoline	8 ft.	Metal	73	12.	Oboe	8 ft.	Metal	73

Three Combination Pistons affecting Swell Organ Stops, Pedal Stops and Swell Organ Couplers

PEDAL ORGAN

13.	Bourdon	16 ft.	Wood	32	14.	Lieblich Gedackt (12 notes from 5)	16 ft.	Wood	20

Three Universal Combination Pistons affecting all Stops and Couplers

COUPLERS

Great to Great 4 ft.	Swell to Great 16 ft.	Swell to Swell 16 ft.	Pedal to Pedal 4 ft.
Swell to Great	Swell to Swell 4 ft.	Swell to Pedal	Swell Unison Separation ("on" and "off" Piston)
Swell to Great 4 ft.	Great Unison Separation ("on" and "off" Piston)	Great to Pedal	

PEDAL MOVEMENTS

Great to Pedal Reversible — Balanced Swell Pedal — Balanced Crescendo and Diminuendo Pedal

MECHANICAL ACCESSORIES

Combination Pistons visibly affecting the stops, double acting and adjustable at the bench:

One Zero Piston cancelling all stops and couplers — Tremolo — Wind Indicator — Crescendo Indicator

Organ Bench with Music Compartment

In place of Pistons noted above there may be Nine Universal Pistons affecting all Stops and Couplers

SUMMARY

	Stops	Pipes
Great Organ	4	244
Swell Organ	8	572
Pedal Organ	2	52
Total Speaking Stops and Pipes	14	868
Couplers	11	
Pedal Movements	3	
Mechanical Accessories	12	

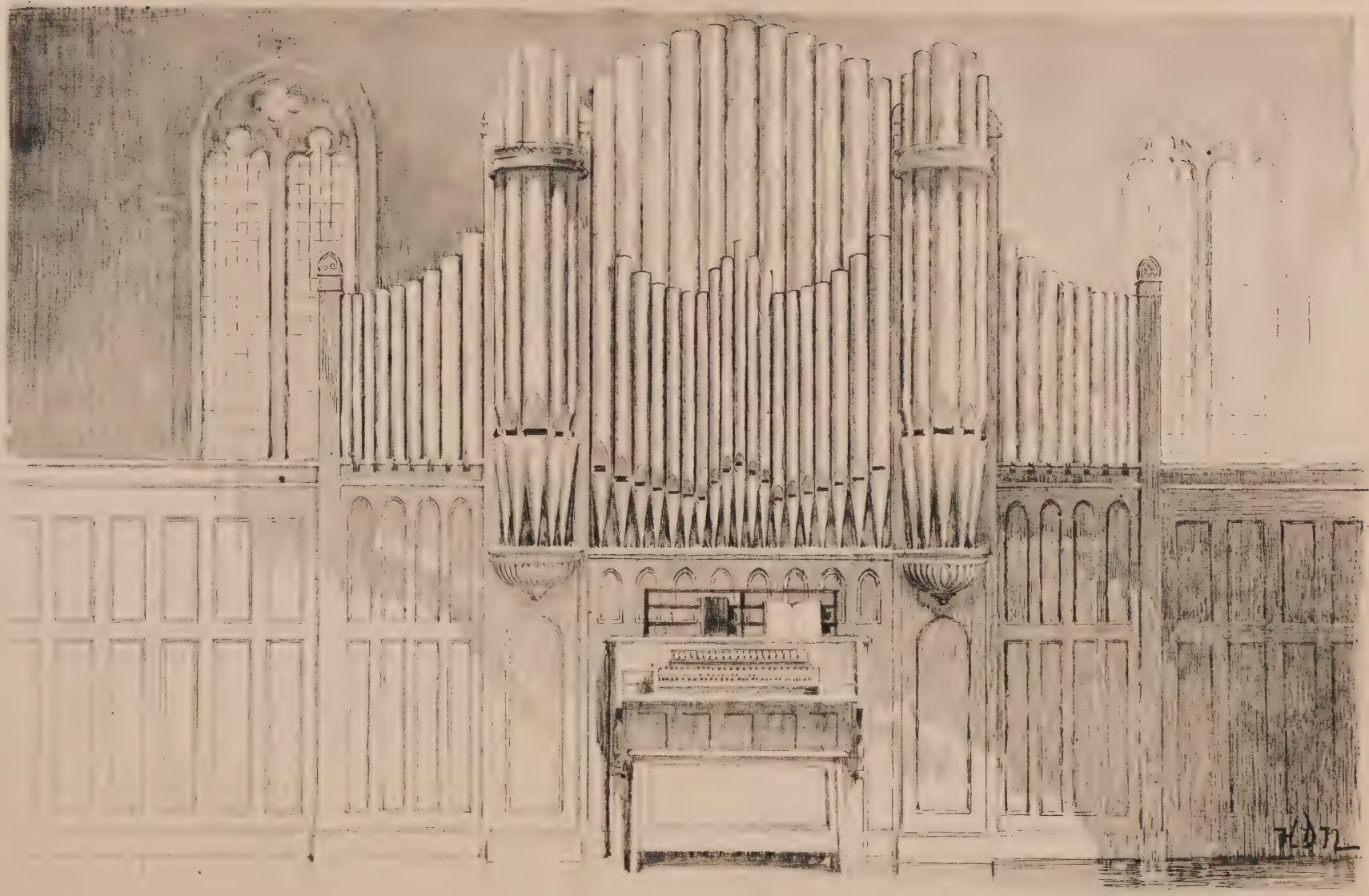


PLATE 4

A SPECIFICATION FOR A TWO-MANUAL ORGAN WITH SIXTEEN STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes
1.	Open Diapason	8 ft.	Metal	61
2.	Gemshorn	8 ft.	Metal	61
3.	Dulciana	8 ft.	Metal	61
4.	Gross Flute	8 ft.	Wood	61
5.	Flute Harmonic	4 ft.	Metal	61

Three Combination Pistons affecting Great Organ Stops, Pedal Stops and Great Organ Couplers

SWELL ORGAN

	Name of Stop	Pitch	Material	Pipes
6.	Bourdon	16 ft.	Wood	73
7.	Open Diapason	8 ft.	Metal	73
8.	Salicional	8 ft.	Metal	73
9.	Aeoline	8 ft.	Metal	73
10.	Stopped Diapason	8 ft.	Wood	73
11.	Voix Celeste	8 ft.	Metal	61
12.	Flauto Traverso	4 ft.	Wood	73
13.	Oboe	8 ft.	Metal	73

Three Combination Pistons affecting Swell Organ Stops, Pedal Stops and Swell Organ Couplers

PEDAL ORGAN

	Name of Stop	Pitch	Material	Pipes
14.	Open Diapason	16 ft.	Wood	32
15.	Bourdon	16 ft.	Wood	32
16.	Lieblich Gedackt (12 notes from 6)	16 ft.	Wood	20

Three Universal Combination Pistons affecting all Stops and Couplers

COUPLERS

Great to Great 4 ft.
Swell to Great
Swell to Great 4 ft.
Swell to Great 16 ft.
Swell to Swell 4 ft.
Great Unison Separation ("on" and "off" Piston)
Swell to Swell 16 ft.
Swell to Pedal
Great to Pedal
Pedal to Pedal 4 ft.
Swell Unison Separation ("on" and "off" Piston)

PEDAL MOVEMENTS

Great to Pedal Reversible
Balanced Swell Pedal
Balanced Crescendo and Diminuendo Pedal

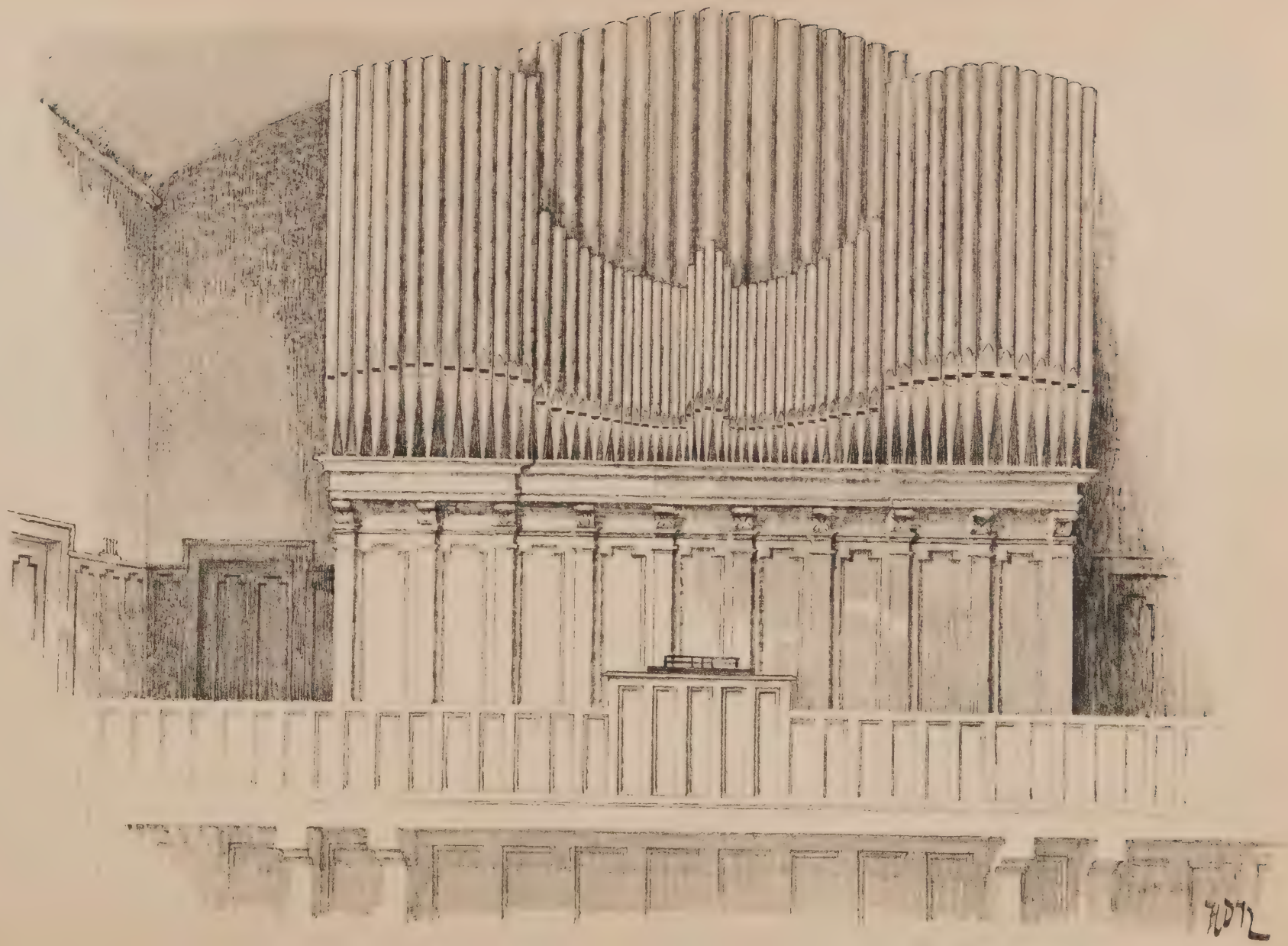
MECHANICAL ACCESSORIES

Combination Pistons visibly affecting the stops, double acting and adjustable at the bench:
One Zero Piston cancelling all stops and couplers
Tremolo
Wind Indicator
Crescendo Indicator
Organ Bench with Music Compartment

In place of Pistons noted above there may be Nine Universal Pistons affecting all Stops and Couplers

SUMMARY

	Stops	Pipes
Great Organ	5	305
Swell Organ	8	572
Pedal Organ	3	84
Total Speaking Stops and Pipes	16	961
Couplers	11	
Pedal Movements	3	
Mechanical Accessories	12	



A SPECIFICATION FOR A TWO-MANUAL ORGAN WITH NINETEEN STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes		Name of Stop	Pitch	Material	Pipes
1.	First Open Diapason	8 ft.	Metal	61	4.	Dulciana	8 ft.	Metal	61
2.	Second Open Diapason	8 ft.	Metal	61	5.	Gross Flute	8 ft.	Wood	61
3.	Gemshorn	8 ft.	Metal	61	6.	Flute Harmonic	4 ft.	Metal	61

Three Combination Pistons affecting Great Organ Stops, Pedal Stops and Great Organ Couplers

SWELL ORGAN

7.	Bourdon	16 ft.	Wood	73	12.	Quintadena	8 ft.	Metal	73
8.	Open Diapason	8 ft.	Metal	73	13.	Stopped Diapason	8 ft.	Wood	73
9.	Salicional	8 ft.	Metal	73	14.	Flauto Traverso	4 ft.	Wood	73
10.	Aeoline	8 ft.	Metal	73	15.	Cornopean	8 ft.	Reeds	73
11.	Voix Celeste	8 ft.	Metal	61	16.	Oboe	8 ft.	Metal	73

Three Combination Pistons affecting Swell Organ Stops, Pedal Stops and Swell Organ Couplers

PEDAL ORGAN

17.	Open Diapason	16 ft.	Wood	32	19.	Lieblich Gedackt (12 notes from 7)	16 ft.	Wood	20
18.	Bourdon	16 ft.	Wood	32					

Three Universal Combination Pistons affecting all Stops and Couplers

COUPLERS

Great to Great 4 ft.	Swell to Great 16 ft.	Swell to Swell 16 ft.	Pedal to Pedal 4 ft.
Swell to Great	Swell to Swell 4 ft.	Swell to Pedal	Swell Unison Separation ("on" and "off" Piston)
Swell to Great 4 ft.	Great Unison Separation ("on" and "off" Piston)	Great to Pedal	

PEDAL MOVEMENTS

Great to Pedal Reversible — Balanced Swell Pedal — Balanced Crescendo and Diminuendo Pedal

MECHANICAL ACCESSORIES

Combination Pistons visibly affecting the stops, double acting and adjustable at the bench:

One Zero Piston cancelling all stops and couplers — Swell Tremolo — Wind Indicator — Crescendo Indicator

Organ Bench with Music Compartment

In place of Pistons noted above there may be Nine Universal Pistons affecting all Stops and Couplers

SUMMARY

	Stops	Pipes
Great Organ	6	366
Swell Organ	10	718
Pedal Organ	3	84
Total Speaking Stops and Pipes	19	1168
Couplers	11	
Pedal Movements	3	
Mechanical Accessories	13	

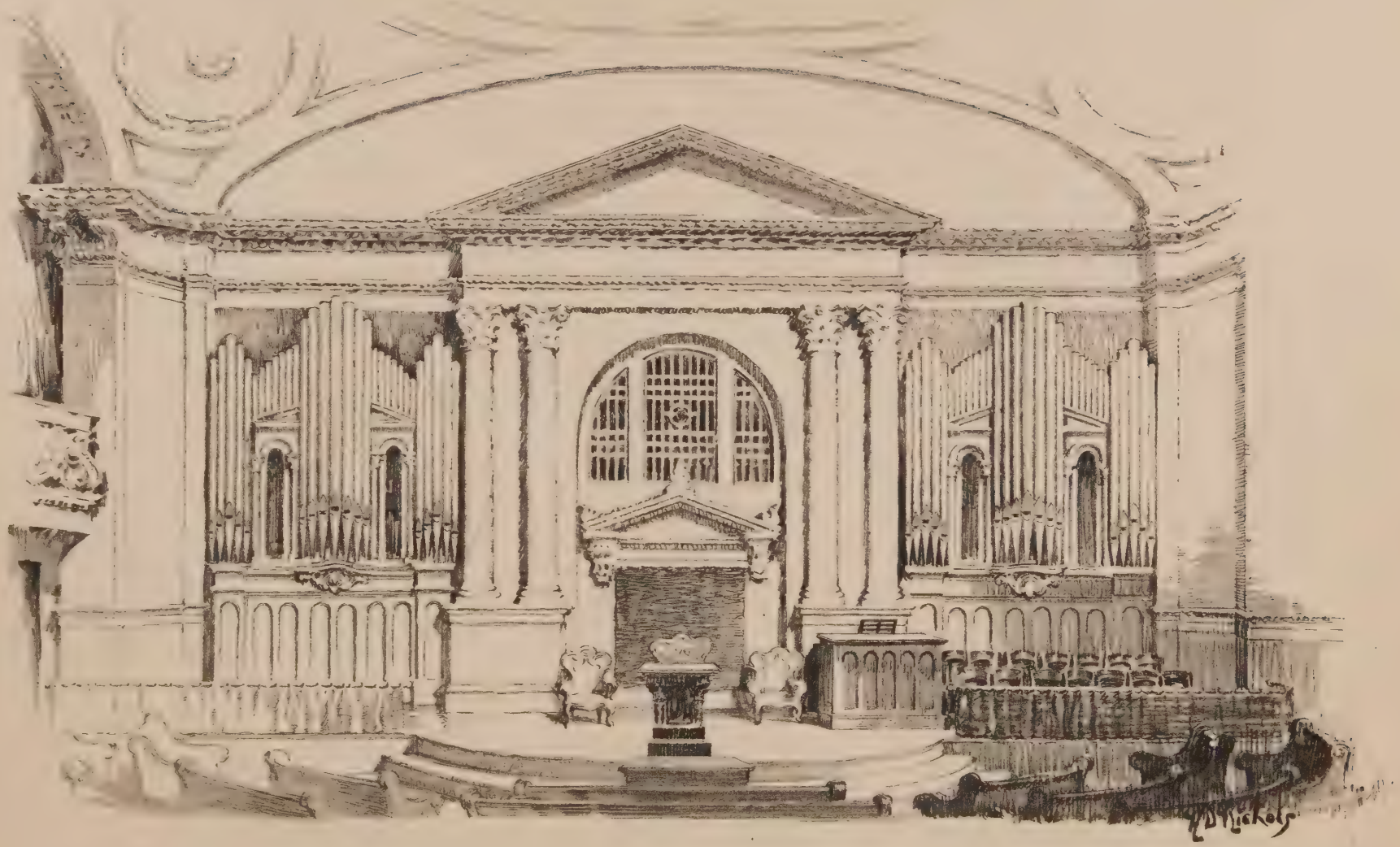


PLATE 6

A SPECIFICATION FOR A TWO-MANUAL ORGAN WITH TWENTY-ONE STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes
1.	First Open Diapason	8 ft.	Metal	61
2.	Second Open Diapason	8 ft.	Metal	61
3.	Gemshorn	8 ft.	Metal	61
4.	Dulciana	8 ft.	Metal	61
5.	Gross Flute	8 ft.	Wood	61
6.	Flute Harmonic	4 ft.	Metal	61
7.	Tuba	8 ft.	Reeds	61

Three Combination Pistons affecting Great Organ Stops, Pedal Stops and Great Organ Couplers

SWELL ORGAN

	Name of Stop	Pitch	Material	Pipes
8.	Bourdon	16 ft.	Wood	73
9.	Open Diapason	8 ft.	Metal	73
10.	Salicional	8 ft.	Metal	73
11.	Aeoline	8 ft.	Metal	73
12.	Voix Celeste	8 ft.	Metal	61
13.	Quintadena	8 ft.	Metal	73
14.	Stopped Diapason	8 ft.	Wood	73
15.	Flauto Traverso	4 ft.	Wood	73
16.	Cornopean	8 ft.	Reeds	73
17.	Oboe	8 ft.	Metal	73
18.	Vox Humana	8 ft.	Reeds	73

Three Combination Pistons affecting Swell Organ Stops, Pedal Stops and Swell Organ Couplers

PEDAL ORGAN

	Name of Stop	Pitch	Material	Pipes
19.	Open Diapason	16 ft.	Wood	32
20.	Bourdon	16 ft.	Wood	32
21.	Lieblich Gedackt (12 notes from 8)	16 ft.	Wood	20

Three Universal Combination Pistons affecting all Stops and Couplers

COUPLERS

Great to Great 4 ft.
Swell to Great
Swell to Great 4 ft.
Swell to Great 16 ft.
Swell to Swell 4 ft.
Great Unison Separation ("on" and "off" Piston)
Swell to Swell 16 ft.
Swell to Pedal
Great to Pedal
Pedal to Pedal 4 ft.
Swell Unison Separation ("on" and "off" Piston)

PEDAL MOVEMENTS

Great to Pedal Reversible
Balanced Swell Pedal
Balanced Crescendo and Diminuendo Pedal

MECHANICAL ACCESSORIES

Combination Pistons visibly affecting the stops, double acting and adjustable at the bench:

One Zero Piston cancelling all stops and couplers
Swell tremolo
Wind Indicator
Crescendo Indicator
Organ Bench with Music Compartment

In place of Pistons noted above there may be Nine Universal Pistons affecting all Stops and Couplers

SUMMARY

	Stops	Pipes
Great Organ	7	427
Swell Organ	11	791
Pedal Organ	3	84
Total Speaking Stops and Pipes	21	1302
Couplers	11	
Pedal Movements	3	
Mechanical Accessories	13	

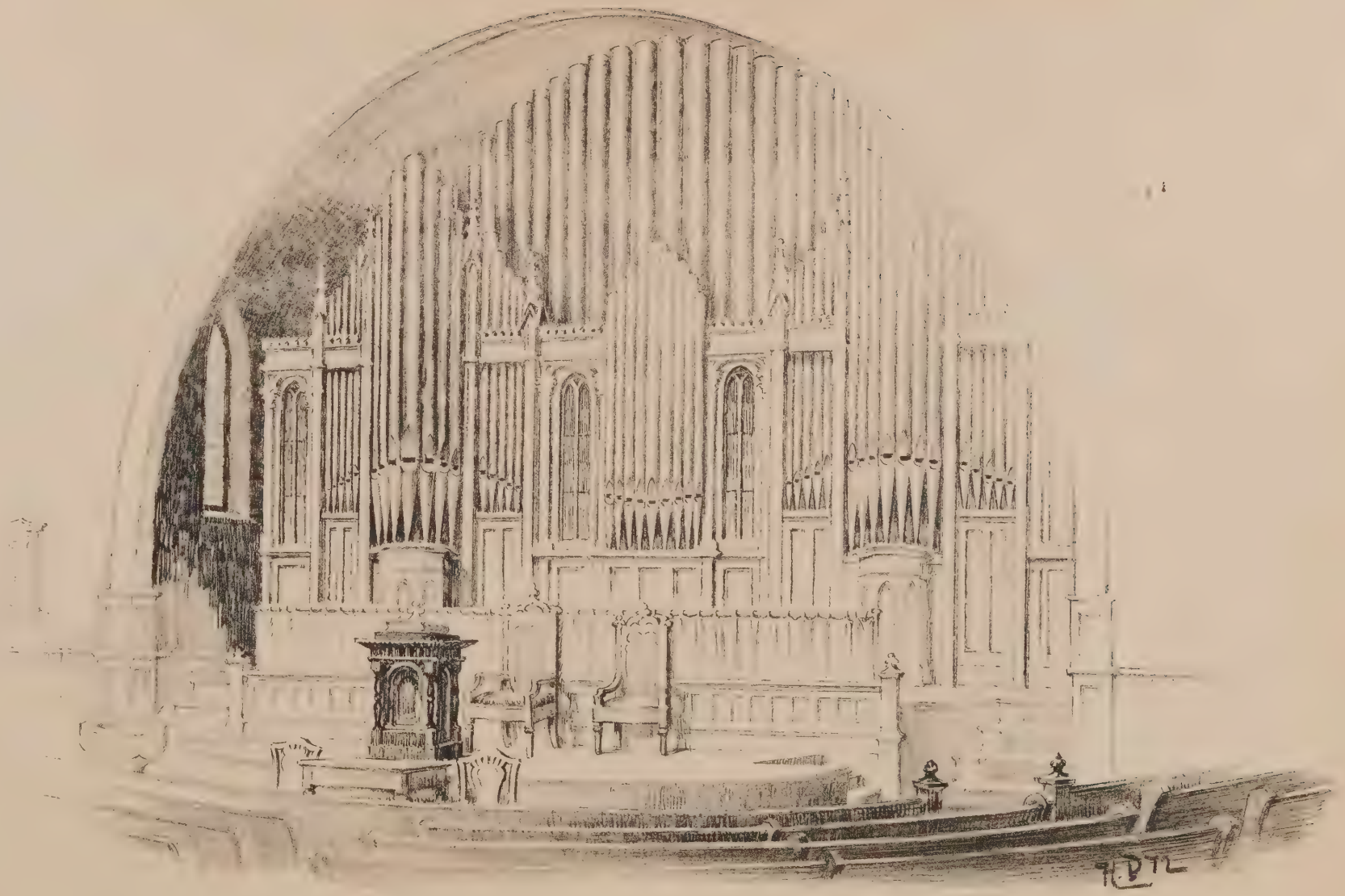


PLATE 7

A SPECIFICATION FOR A THREE-MANUAL ORGAN WITH TWENTY-TWO STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes Notes
1.	Open Diapason	8 ft.	Metal	61
2.	Dulciana	8 ft.	Metal	61
3.	Melodia	8 ft.	Wood	61
4.	Gross Flute	8 ft.	Wood	61
5.	Flute Harmonic	4 ft.	Metal	61

Three Combination Pistons affecting Great Stops and Couplers

SWELL ORGAN

	Name of Stop	Pitch	Material	Pipes Notes
6.	Bourdon	16 ft.	Wood	73
7.	Open Diapason	8 ft.	Metal	73
8.	Salicional	8 ft.	Metal	73
9.	Voix Celeste	8 ft.	Metal	61
10.	Stopped Diapason	8 ft.	Metal	73
11.	Flauto Traverso	4 ft.	Wood	73
12.	Oboe	8 ft.	Metal	73
13.	Cornopean	8 ft.	Reeds	73
14.	Vox Humana	8 ft.	Reeds	73

Four Combination Pistons affecting Swell Stops and Couplers

CHOIR ORGAN

	Name of Stop	Pitch	Material	Pipes Notes
15.	Violin Diapason	8 ft.	Metal	73
16.	Viol d'Amour	8 ft.	Metal	73
17.	Clarabella	8 ft.	Wood	73
18.	Flute d'Amour	4 ft.	W. and M.	73

Three Combination Pistons affecting Choir Stops and Couplers

PEDAL ORGAN

	Name of Stop	Pitch	Material	Pipes Notes
19.	Open Diapason	16 ft.	Wood	44
20.	Bourdon	16 ft.	Wood	32
21.	Lieblich Gedackt (from 6)	16 ft.	Wood	20 32
22.	Bass Flute (from 19)	8 ft.	Wood	32

Four Combination Pistons affecting Pedal Stops and Couplers

COUPLERS

Great to Great 4 ft.
Swell to Great 4 ft.
Swell to Great 8 ft.
Swell to Great 16 ft.
Choir to Great 4 ft.
Choir to Great 8 ft.
Choir to Great 16 ft.
Swell to Swell 4 ft.
Swell to Swell 16 ft.
Swell Unison Separation ("on" and "off" Piston)
Swell to Choir 8 ft.
Choir to Choir 4 ft.
Choir to Choir 16 ft.
Great to Pedal
Swell to Pedal
Choir to Pedal
Pedal to Pedal 4 ft.
Great Unison Separation ("on" and "off" Piston)
Choir Unison Separation ("on" and "off" Piston)

PEDAL MOVEMENTS

Balanced Swell Pedal
Balanced Choir Pedal
Balanced Adjustable Crescendo Pedal with Indicator
Great to Pedal Reversible
Swell to Pedal Reversible

MECHANICAL ACCESSORIES

Combination Pistons to be adjustable at bench and to visibly affect stop tablets:
One Zero Piston cancelling all stops and couplers
Great Tremolo
Swell tremolo
Choir Tremolo
Crescendo Indicator
Organ Bench with Music Compartment

SUMMARY

	Stops	Pipes	Notes
Great Organ	5	305	
Swell Organ	9	645	
Choir Organ	4	292	
Pedal Organ	4	96	64
Total Speaking Stops, Pipes and Notes	22	1338	64
Couplers	19		
Pedal Movements	5		
Mechanical Accessories	20		

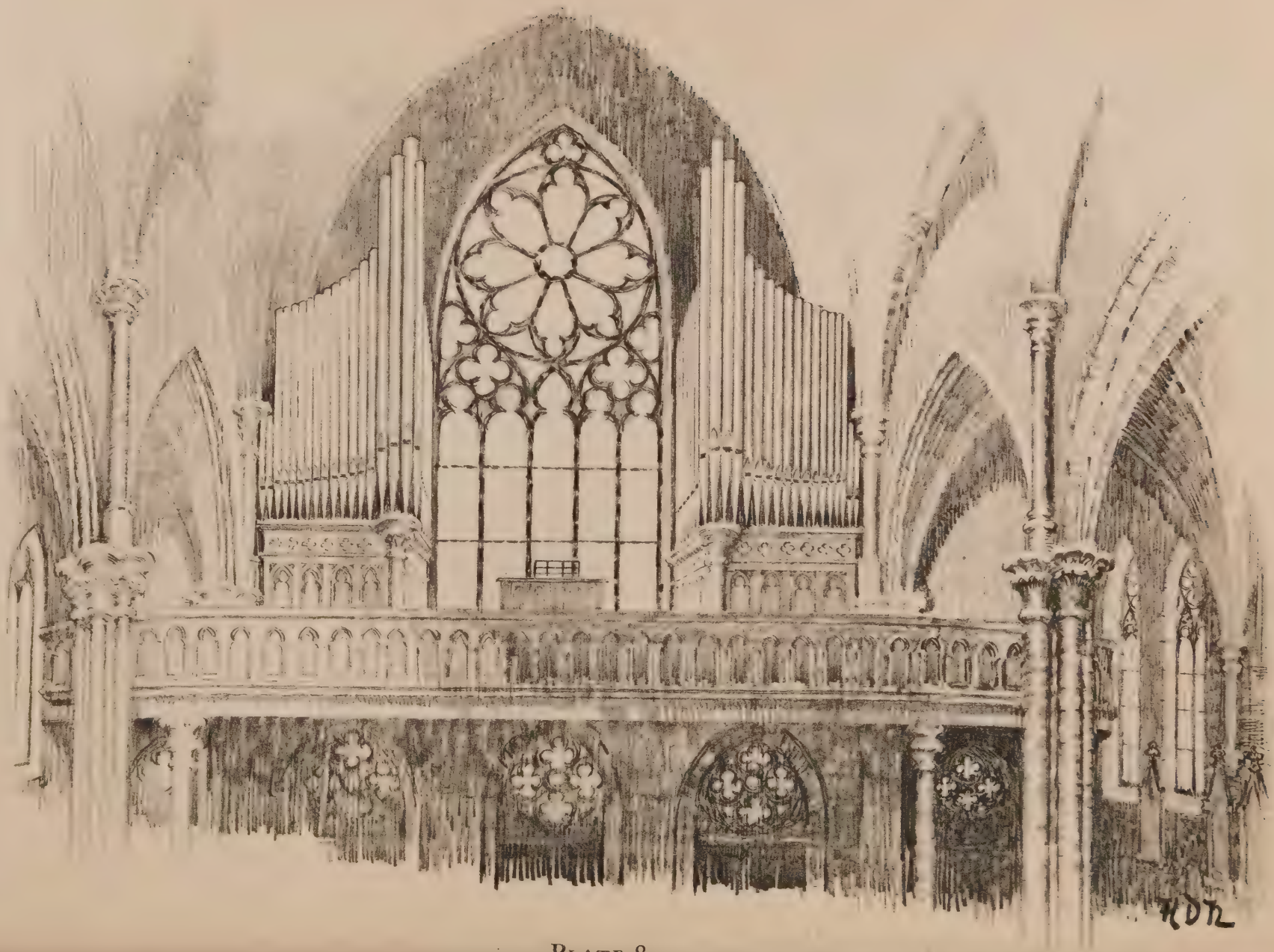


PLATE 8

A SPECIFICATION FOR A THREE-MANUAL ORGAN WITH TWENTY-NINE STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
1.	Open Diapason	8 ft.	Metal	61	
2.	Second Open Diapason	8 ft.	Metal	61	
3.	Dulciana	8 ft.	Metal	61	
4.	Gemshorn	8 ft.	Metal	61	
5.	Gross Flute	8 ft.	Wood	61	
6.	Melodia	8 ft.	Wood	61	
7.	Flute Harmonic	4 ft.	Metal	61	

Four Combination Pistons affecting Great Stops and Couplers

SWELL ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
8.	Bourdon	16 ft.	Wood	73	
9.	Open Diapason	8 ft.	Metal	73	
10.	Salicional	8 ft.	Metal	73	
11.	Voix Celeste	8 ft.	Metal	61	
12.	Aeoline	8 ft.	Metal	73	
13.	Stopped Diapason	8 ft.	Metal	73	
14.	Flauto Traverso	4 ft.	Wood	73	
15.	Oboe	8 ft.	Metal	73	
16.	Cornopean	8 ft.	Reeds	73	
17.	Vox Humana	8 ft.	Reeds	73	
18.	Chimes				20

Five Combination Pistons affecting Swell Stops and Couplers

CHOIR ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
19.	Violin Diapason	8 ft.	Metal	73	
20.	Viol d'Amour	8 ft.	Metal	73	
21.	Clarabella	8 ft.	Wood	73	
22.	Unda Maris	8 ft.	Wood	61	
23.	Flute d'Amour	4 ft.	W. and M.	73	
24.	Clarinet	8 ft.	Metal	73	

Three Combination Pistons affecting Choir Stops and Couplers

PEDAL ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
25.	Open Diapason	16 ft.	Wood	44	
26.	Bourdon	16 ft.	Wood	32	
27.	Lieblich Gedackt (from 8)	16 ft.	Wood	20	32
28.	Bass Flute (from 25)	8 ft.	Wood		32
29.	Violone	16 ft.	Metal	32	

Four Combination Pistons affecting Pedal Stops and Couplers

COUPLERS

Great to Great 4 ft.
Swell to Great 4 ft.
Swell to Great 8 ft.
Swell to Great 16 ft.
Choir to Great 4 ft.
Choir to Great 8 ft.
Choir to Great 16 ft.
Swell to Swell 4 ft.
Swell to Swell 16 ft.
Swell Unison Separation ("on" and "off" Piston)
Swell to Choir 8 ft.
Choir to Choir 4 ft.
Choir to Choir 16 ft.
Great to Pedal
Swell to Pedal
Choir to Pedal
Pedal to Pedal 4 ft.
Great Unison Separation ("on" and "off" Piston)
Choir Unison Separation ("on" and "off" Piston)

PEDAL MOVEMENTS

Balanced Swell Pedal
Balanced Choir Pedal
Balanced Adjustable Crescendo Pedal with Indicator
Great to Pedal Reversible
Swell to Pedal Reversible

MECHANICAL ACCESSORIES

Combination Pistons to be adjustable at bench and to visibly affect stop tablets:

One Zero Piston cancelling all stops and couplers
Great Tremolo
Swell tremolo
Choir Tremolo
Crescendo Indicator
Organ Bench with Music Compartment

SUMMARY

	Stops	Pipes	Notes
Great Organ	7	427	
Swell Organ	11	718	20
Choir Organ	6	426	
Pedal Organ	5	128	64
Total Speaking Stops, Pipes and Notes	29	1699	84
Couplers	19		
Pedal Movements	5		
Mechanical Accessories	22		

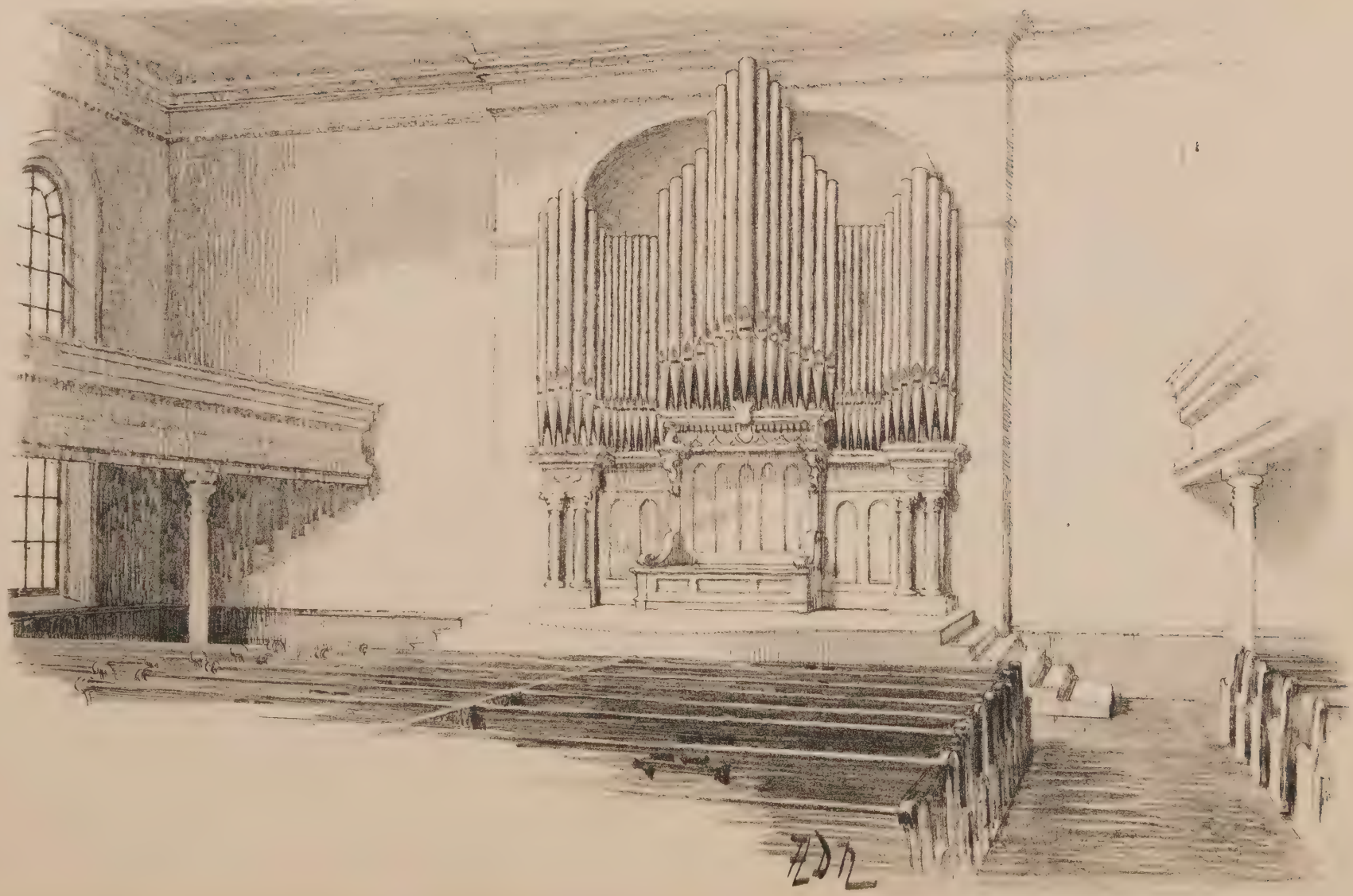


PLATE 9

A SPECIFICATION FOR A THREE-MANUAL ORGAN WITH FORTY-FOUR STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
1.	Open Diapason	8 ft.	Metal	61	
2.	Second Open Diapason	8 ft.	Metal	61	
3.	Dulciana	8 ft.	Metal	61	
4.	Gemshorn	8 ft.	Metal	61	
5.	Gross Flute	8 ft.	Wood	61	
6.	Melodia	8 ft.	Wood	61	
7.	Flute Harmonic	4 ft.	Metal	61	
8.	Tuba	8 ft.	Reeds	61	

Four Combination Pistons affecting Great Stops and Couplers

SWELL ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
9.	Bourdon	16 ft.	Wood	73	
10.	Open Diapason	8 ft.	Metal	73	
11.	Viol d'Orchestre	8 ft.	Metal	73	
12.	Salicional	8 ft.	Metal	73	
13.	Voix Celeste	8 ft.	Metal	61	
14.	Stopped Diapason	8 ft.	Metal	73	
15.	Aeoline	8 ft.	Metal	73	
16.	Flauto Traverso	4 ft.	Wood	73	
17.	Oboe	8 ft.	Metal	73	
18.	Cornopean	8 ft.	Reeds	73	
19.	Vox Humana	8 ft.	Reeds	73	
20.	Harp				49

Eight Combination Pistons affecting Swell and Echo Stops and Swell Couplers

CHOIR ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
21.	Contra Viol	16 ft.	Metal	73	
22.	Violin Diapason	8 ft.	Metal	73	
23.	Viol d'Amour	8 ft.	Metal	73	
24.	Clarabella	8 ft.	Wood	73	
25.	Unda Maris	8 ft.	Wood	61	
26.	Flute d'Amour	4 ft.	W. and M.	73	
27.	Clarinet	8 ft.	Metal	73	
28.	Piccolo	2 ft.	Metal	73	

Five Combination Pistons affecting Choir Stops and Couplers

ECHO ORGAN

Playable from Swell Manual and affected by Swell Couplers

	Name of Stop	Pitch	Material	Pipes	Notes
29.	Echo Diapason	8 ft.	Metal	73	
30.	Muted Viol	8 ft.	Metal	73	
31.	Muted Celeste	8 ft.	Metal	61	
32.	Rohr Flute	8 ft.	Wood	73	
33.	Concert Flute	4 ft.	Wood	73	
34.	Vox Humana	8 ft.	Reeds	73	
35.	Chimes				20

PEDAL ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
36.	Resultant	32 ft.	Wood		32
37.	Open Diapason	16 ft.	Wood	44	
38.	Bourdon	16 ft.	Wood	32	
39.	Lieblich Gedackt (12 from 9)	16 ft.	Wood	20	32
40.	Bass Flute (from 37)	8 ft.	Wood		32
41.	Contra Viol (from 21)	16 ft.	Metal		32
42.	Echo Bourdon	16 ft.	Wood	32	
43.	Tuba (from 8)	8 ft.	Reeds		32
44.	Trombone	16 ft.	Reeds	32	

Six Combination Pistons affecting Pedal Stops and Couplers

COUPLERS

Great to Great 4 ft.
Swell to Great 4 ft.
Swell to Great 8 ft.
Swell to Great 16 ft.
Choir to Great 4 ft.
Choir to Great 8 ft.
Choir to Great 16 ft.
Swell to Swell 4 ft.
Swell to Swell 16 ft.
Swell Unison Separation ("on" and "off" Piston)
Swell to Choir 8 ft.
Choir to Choir 4 ft.
Choir to Choir 16 ft.
Great to Pedal
Swell to Pedal
Choir to Pedal
Pedal to Pedal 4 ft.
Great Unison Separation ("on" and "off" Piston)
Choir Unison Separation ("on" and "off" Piston)

PEDAL MOVEMENTS

Balanced Swell Pedal
Balanced Adjustable Crescendo Pedal with Indicator
Balanced Echo Pedal
Great to Pedal Reversible
Balanced Choir Pedal
Swell to Pedal Reversible

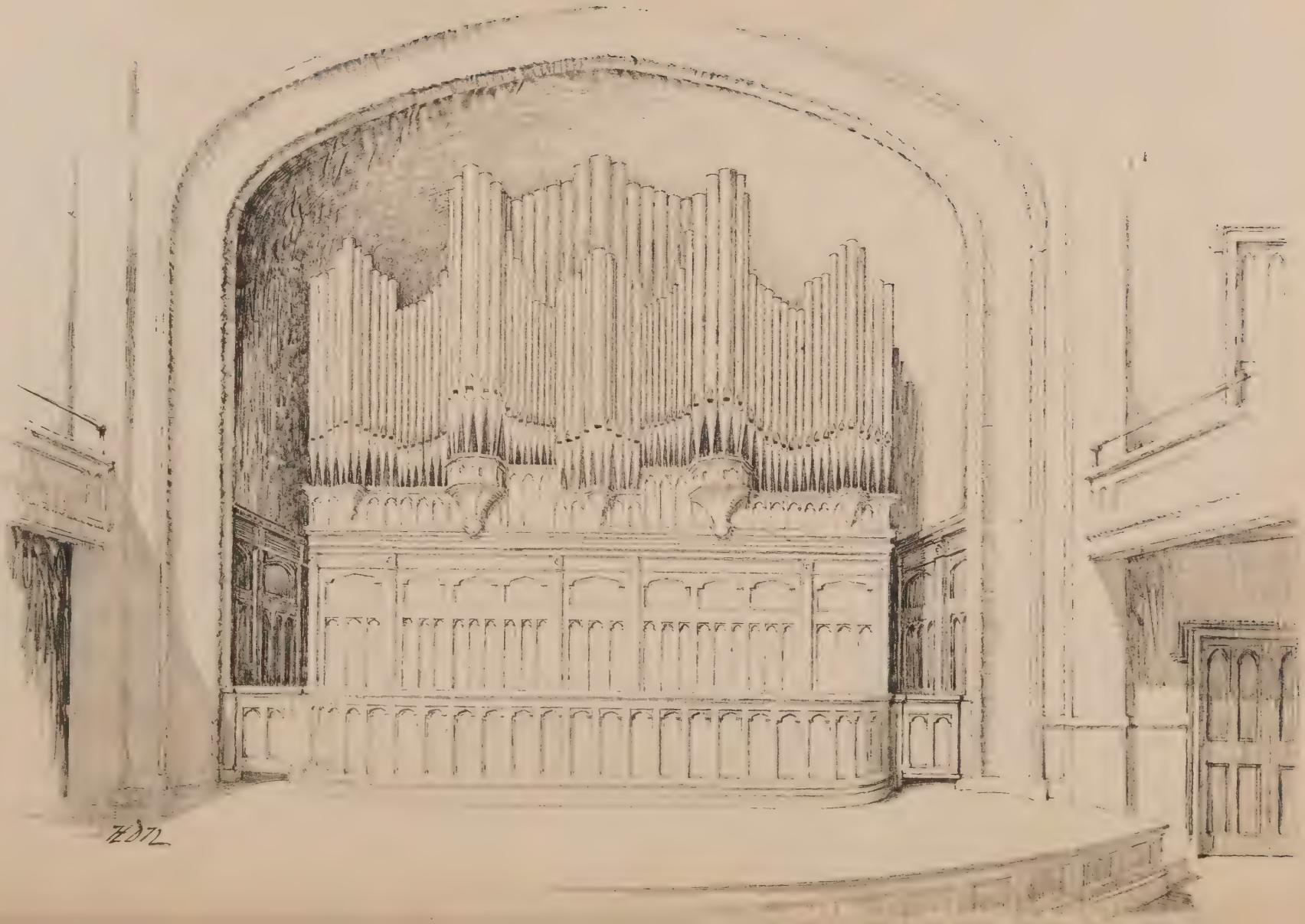
MECHANICAL ACCESSORIES

Combination Pistons to be adjustable at bench and to visibly affect stop tablets:

One Zero Piston cancelling all stops and couplers
Great Tremolo
Swell tremolo
Echo Tremolo
Choir Tremolo
Crescendo Indicator
Organ Bench with Music Compartment

SUMMARY

	Stops	Pipes	Notes
Great Organ	8	488	
Swell Organ	12	791	49
Choir Organ	8	572	
Echo Organ	7	426	20
Pedal Organ	9	160	160
Total Speaking Stops, Pipes and Notes	44	2437	229
Couplers	19		
Pedal Movements	6		
Mechanical Accessories	30		



A SPECIFICATION FOR A THREE-MANUAL ORGAN WITH FIFTY-ONE STOPS

GREAT ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
1.	Open Diapason	16 ft.	Metal	61	
2.	Open Diapason	8 ft.	Metal	61	
3.	Second Open Diapason	8 ft.	Metal	61	
4.	Dulciana	8 ft.	Metal	61	
5.	Melodia	8 ft.	Wood	61	
6.	Gross Flute	8 ft.	Wood	61	
7.	Gemshorn	8 ft.	Metal	61	
8.	Viol d'Amour	8 ft.	Metal	61	
9.	Wald Flute	4 ft.	Metal	61	
10.	Octave	4 ft.	Metal	61	
11.	Ophecleide	16 ft.	Reeds		
12.	Tuba	8 ft.	Reeds	85	
13.	Clarion	4 ft.	Reeds		
14.	Harp				49
15.	Chimes				20

Eight Combination Pistons affecting Great Stops and Couplers

SWELL ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
16.	Bourdon	16 ft.	Wood	73	
17.	Open Diapason	8 ft.	Metal	73	
18.	Salicional	8 ft.	Metal	73	
19.	Voix Celeste	8 ft.	Metal	61	
20.	Viol d'Orchestre	8 ft.	Metal	73	
21.	Viol Celeste	8 ft.	Metal	61	
22.	Aeoline	4 ft.	Metal	73	
23.	Stopped Diapason	8 ft.	Metal	73	
24.	Flauto Traverso	4 ft.	Wood	73	
25.	Solo Cornet Mixture	III Rks.	Metal	183	
26.	Cornopean	8 ft.	Reeds	73	
27.	Oboe	8 ft.	Metal	73	
28.	French Horn	8 ft.	Reeds	73	
29.	Vox Humana	8 ft.	Reeds	73	

Eight Combination Pistons affecting Swell Stops and Couplers

CHOIR ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
30.	Contra Viol	16 ft.	Metal	73	
31.	Geigen Principal	8 ft.	Metal	73	
32.	Muted Viol	8 ft.	Metal	73	
33.	Clarabella	8 ft.	Wood	73	
34.	Unda Maris	8 ft.	Wood	61	
35.	Flute d'Amour	4 ft.	W. and M.	73	
36.	Clarinet	8 ft.	Metal	73	
37.	Piccolo	2 ft.	Metal	73	
38.	Harp				49
39.	Chimes				20

Six Combination Pistons affecting Choir Stops and Couplers

PEDAL ORGAN

	Name of Stop	Pitch	Material	Pipes	Notes
40.	Resultant	32 ft.	Wood		32
41.	Open Diapason	16 ft.	Wood	44	
42.	Bourdon	16 ft.	Wood	32	
43.	Bourdon (Processional Organ)	16 ft.	Wood	32	
44.	Violone (from 30)	16 ft.	Metal		32
45.	Lieblich Gedackt (12 from 16)	16 ft.	Wood		32
46.	Octave (from 10)	4 ft.	Metal		32
47.	Bass Flute (from 41)	8 ft.	Wood		32
48.	Ophecleide (from 11)	16 ft.	Reeds		32

Eight Combination Pistons affecting Pedal Stops and Couplers

PROCESSIONAL ORGAN

Playable from Swell Manual and affected by Swell Couplers

	Name of Stop	Pitch	Material	Pipes	Notes
49.	Open Diapason	8 ft.	Metal	73	
50.	Concert Flute	8 ft.	Wood	73	
51.	Flute	4 ft.	Metal	73	

COUPLERS

Great to Great 4 ft.
Swell to Great 4 ft.
Swell to Great 8 ft.
Swell to Great 16 ft.
Choir to Great 4 ft.
Choir to Great 8 ft.
Choir to Great 16 ft.
Swell to Swell 4 ft.
Swell to Swell 16 ft.
Swell Unison Separation ("on" and "off" Piston)
Swell to Choir 8 ft.
Choir to Choir 4 ft.
Choir to Choir 16 ft.
Great to Pedal
Swell to Pedal
Choir to Pedal
Pedal to Pedal 4 ft.
Great Unison Separation ("on" and "off" Piston)
Choir Unison Separation ("on" and "off" Piston)

PEDAL MOVEMENTS

Balanced Swell Pedal
Balanced Choir Pedal
Balanced Crescendo Pedal with Indicator
Great to Pedal Reversible
Swell to Pedal Reversible

MECHANICAL ACCESSORIES

Combination Pistons to be adjustable at bench and to visibly affect stop tablets:

One Zero Piston cancelling all stops and couplers
Great Tremolo
Swell tremolo
Choir Tremolo
Crescendo Indicator
Electric Motor and Blower
Organ Bench with Music Compartment

SUMMARY

	Stops	Pipes	Notes
Great Organ	15	695	69
Swell Organ	14	1108	
Choir Organ	10	572	69
Processional Organ	3	219	
Pedal Organ	9	108	192
Total Speaking Stops, Pipes and Notes	51	2702	330
Couplers	19		
Pedal Movements	5		
Mechanical Accessories	37		

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